July 1988 The Naval Aviation Safety Review

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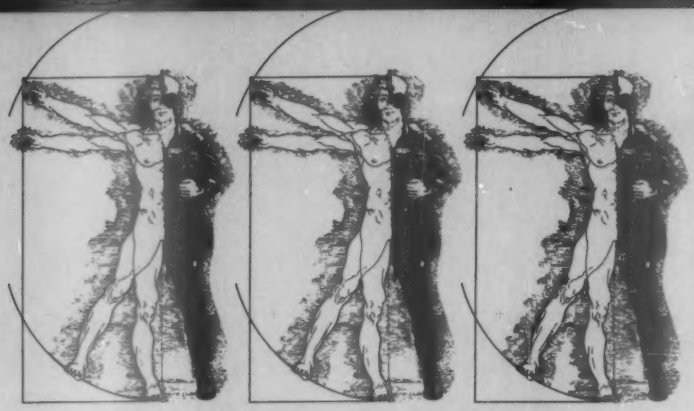
approach looks at aviation life support systems



Your Survival and the "System"

No subject is taken more seriously by aircrew personnel than their own survival. When we start talking about flight gear, the closest thing to an aviator's body, it stimulates a lot of interest. Flight gear and survival equipment, officially termed Aviation Life Support Systems, come under the auspices of the Crew Systems Division in the Naval Air Systems Command. Approach first introduced an ALSS-related theme in the October 1986 issue. That issue generated a tremendous response from aircrew personnel and those involved with ALSS. Because of that interest, we are again featuring ALSS-related topics in this issue.

Aircrew personnel want flight gear to be comfortable, and they want it to provide the maximum protection and capability. These conflicting demands are where controversy finds ample fuel because you obviously can't have the best of both. Any design for flight gear involves compromise between comfort and performance. The dry suit with the best performance would be so thick that it could hardly be worn under a torso harness and would scarcely allow the wearer flexibility to move. Conversely, a dry suit designed for ultimate comfort would be so thin that it would give little protection. Everyone has a different opinion on what the best compromise is.

When all the players can come to terms on design compromises, it still takes years to get from operational requirement (OR) to initial operational capability (IOC). This seemingly inordinate period of time is a common sore point among the users, especially when a sister service or foreign service has a "better" helmet or dry suit already in service. With leaner fiscal times ahead, as well as pressure for commonality, more compromises are in our future. These compromises may mean less optimum designs for a specific community, yet cheaper equipment because of buying in bulk.

There have been some notable successes. SEAWARS, FLU-8 and HEEDS have all entered service in recent years and they have saved lives. The "system" does work, perhaps not as quickly as everyone would like, but it certainly is trying to improve existing equipment and develop new solutions to ALSS problems. If you wear wings, there is something you can do other than sound off in the ready room. The system doesn't have your ready room bugged. You have to let them know what you don't like or what problem you'd like to see addressed.

How do you talk to the system? There are many ways. You can start with your parachute rigger (PR) who should be versed in communicating your need to the system with a RAMEC, QDR or Beneficial Suggestion. You can call your local AMSO or FAILSAFE team, both of which have the gouge. Finally, the Crew Systems people are only a phone call away and would be happy to assist you. A fact often lost in the shuffle is that all ALSS initiatives start with the users in the fleet. The money goes to operational requirements that are fleet generated. That means your voice is crucial in creating an OR or in giving priority to an existing one.

Crew Systems people hit the road annually to visit air stations with their latest wares. Their road show gives you an opportunity to see what's being developed and to talk firsthand with the system. This cross-talk is important, and it would behoove you to find out when the road show is in town. This fall, the first Operational Advisory Group (OAG) for ALSS will kick off. This meeting will be a primary opportunity for users to make their wishes known to the decision makers. If you can't make it yourself, get your input to your functional wing and make sure they present your views.

With all these avenues open to you, why not let the system know about your problem or gripe. You don't have to join the system —just work with it to get what you really want. After all, it's your life that's on the line.

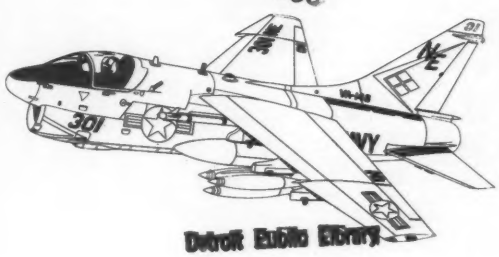
LCdr Dave Parsons
Editor

inside approach

Vol. 34 No. 1

Brakes, Brakes! Eject! This A-7 pilot was forced to eject when his hook spit the wire and left him too fast to stop and too slow to fly. USN Photo

FEATURES



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Approach is a monthly publication published by the Commander, Naval Safety Center. Address comments, contributions and questions about distribution and reprints to:

Commander, Naval Safety Center
NAS Norfolk, VA 23511-5796
Attention: Approach — Code 71

Telephone: Commercial 804-444-7416; Autovon 564-7416

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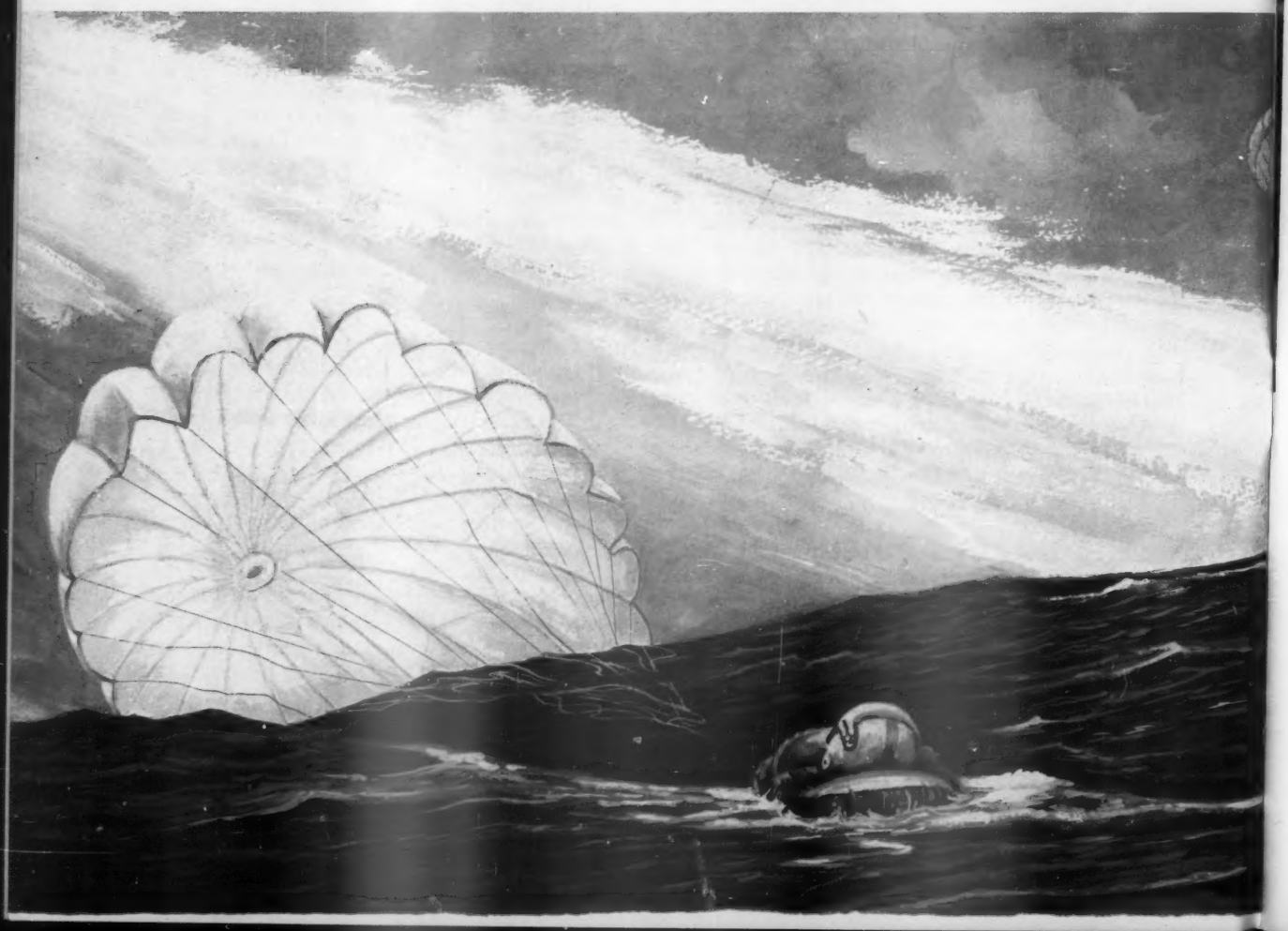
POSTMASTER: Send address changes to APPROACH Magazine, Naval Safety Center, NAS Norfolk, VA 23511-5796.

. . . The FLU-8 and SEAWARS devices have virtually eliminated the entanglement, dragging and flotation problems faced by aircrews ejecting over water . . .

A New Era In

SURVIVAL in the water following ejection from or ditching of both fixed- and rotary-wing aircraft has always been a major concern of the Navy. Many lives have been claimed by the sea after successful ejections and ditchings.

The Navy has dramatically improved the odds for water survival with the incorporation of the FLU-8 automatic life vest inflator in 1980 and, more recently, with the SEAWARS automatic parachute divestment device in 1984. Table 1 illustrates the improvement in survival for overwater ejections.



Water Survival

By Sharone Thornton

Table 1

Overwater Survival Rates

CY	Ejections	Fatalities	Survival Rate
1976	37	8	78%
1977	44	10	77%
1978	53	12	77%
1979	31	7	77%
1980	(FLU-8 introduced)		
1983	47	7	85%
1984	38	5	87%
1985	17	1	94%
1986	34	2	94%

Table 2

Overwater Ejections 1976 — 1979

CY	Ejections	Fatalities	Drownings	Lost at Sea
1976	37	8	2	5
1977	44	10	3	5
1978	53	12	4	6
1979	31	7	1	5
Totals	165	37	10	21

Table 2 shows the ejection survival data from 1976-1979. There were 165 overwater ejections resulting in 37 fatalities. Of these 37 fatalities, there were 10 drownings where a body was retrieved and drowning was proven to be the cause of death. Twenty-one of the remainder were lost at sea. Twelve were either out of the envelope or most likely suffered fatal injury during the ejection.

The remaining nine were probable drownings where the person who ejected was seen in the water, struggling to stay afloat, but eventually was lost at sea. He most likely was entangled in the parachute shroudlines and may have suffered some dragging on water entry. Some personnel may not have been able to inflate the life vest for various reasons. More than half of the overwater ejection fatalities during this period were caused by drowning or probable drowning. They were observed descending normally under good parachutes, but for some reason, failed to divest themselves of their parachutes and did not activate their flotation equipment.

Table 3 shows the overwater ejection survival data for 1983 through 1986. Remember that FLU-8 was first incorporated during 1980, and by 1983 most ejection-seat aircraft were equipped with the devices.

Table 3

Overwater Ejections 1983 — 1986

CY	Ejections	Fatalities	Drownings	Lost at Sea
1983	47	7	2	2
1984	38	5	None	None
1985	17	1	None	None
1986	34	2	1	None
Totals	136	15	3	2

During this period, there were 136 overwater ejections resulting in 15 fatalities. Of these 15, three drowned, two during 1983. The first was not equipped with the FLU-8 and had failed to inflate his LPU. He was observed struggling in the water but disappeared before the pilot could swim to him. The second victim was found approximately 4 feet underwater with his fully deployed parachute holding him down like a sea anchor. He had pulled the beaded handles, fully inflating his LPU, and had deployed both the raft and the seatpan. It is surmised that he was executing the proper survival procedures during descent, but was unable to release the koch fittings on water entry. If SEAWARS had been available at that time, he would still be flying today.

The drowning in 1986 occurred when a Naval Aviation Depot test pilot ejected at high speed. He suffered bilateral

dislocated elbows due to flailing, making him unable to inflate his life vest. SEAWARS automatically divested him of the parachute, but he was not equipped with the FLU-8. A diving team 500 meters away arrived in time to see the chute sink out of sight. Autopsy later confirmed death by drowning. A FLU-8 would have saved this aviator's life. Investigation showed that the depot was in the process of installing FLU-8s but had not yet gotten to this pilot's gear.

Of the two lost-at-sea fatalities, one was out of the envelope for safe ejection and the other was never seen following ejection.

There were no drownings during 1984 and 1985 and no lost-at-sea fatalities during either 1984, 1985 or 1986 (Table 3). It was the first time that no ejecting pilots were lost at sea.

Table 4

1980 — 1986

261 Overwater Ejections

231 Survived	30 Fatals
60 Auto actuation	14 Auto actuation
17 Saves	13 Recovered

A look at overall use (Table 4) of both FLU-8 and SEAWARS shows that these devices, though installed only as a backup method of actuation, have benefited at least 60 pilots who ejected but were unable to inflate their life vests or release their chutes before water entry. The automatic actuation of parachute separation and life vest inflation allowed the aviator to complete his survival procedures and await rescue. Of the 60 cases of automatic actuation, FLU-8 and SEAWARS were credited with saving the lives of 17 aviators. Also, 13 bodies were recovered because the automatic actuation kept them afloat until rescuers arrived.

The perfect testimonial for FLU-8 and SEAWARS occurred in 1985. Following ejection, a pilot sustained a cervical fracture and concussion during severe parachute opening shock. He was knocked unconscious. Luckily (as it turned out), he also lost his helmet and mask. Following seat separation, the seat tumbled and returned to impact the RSSK and fracture the pilot's lower leg. This collision caused the RSSK to open prematurely, releasing the life raft and causing the lap belt assembly and carrier straps to tear away completely, releasing the RSSK and life raft. The remainder of the descent and water entry were apparently normal, since the pilot was located one hour later, still unconscious. The life vest had inflated automatically, keeping his head out of the water, and SEAWARS had released him from the parachute. The helo rotorwash roused him, and he was semiconscious as the swimmer attached and hoisted him into the helo. The FLU-8 and SEAWARS saved this pilot's life since he was totally incapable of accomplishing the necessary survival procedures himself.

Unfortunately, these lifesaving devices cannot be used in helicopters. Water survival problems for helo occupants are infinitely more complex. Helicopter occupants need not worry about getting tangled in the chute or being dragged once they emerge from the aircraft. However, trying to escape from a suddenly water-filled, sinking and usually inverted aircraft has taken many lives.

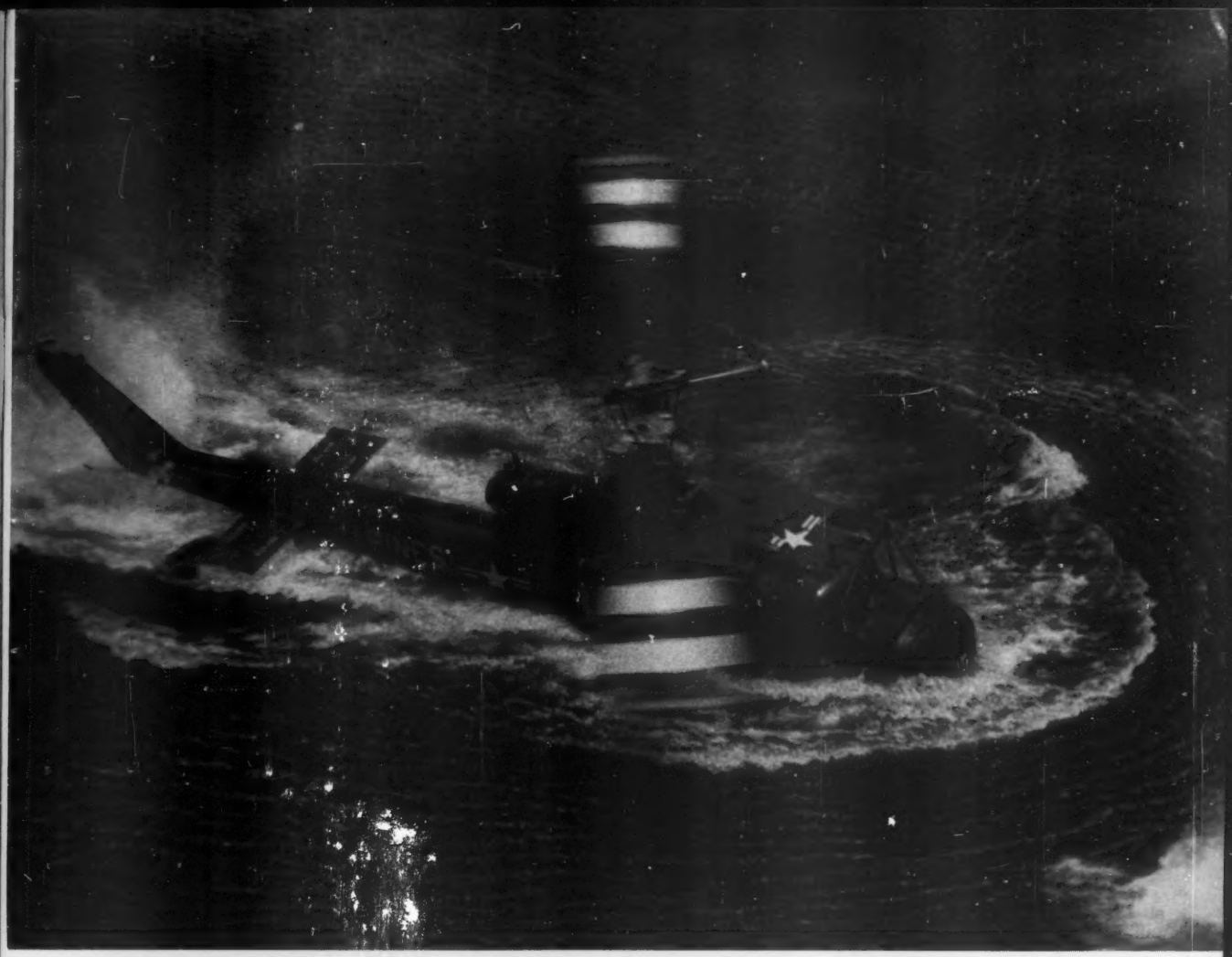
Table 5

Helicopter Water Survival

1977-1979 vs. 1984-1986

CY	Total Mishaps	Total Occupants	Total Fatalities	Survival Rate
1977	5	22	3	86%
1978	7	27	6	78%
1979	10	65	5	92%
Totals	22	114	14	88%
1984	9	39	9	77%
1985	12	75	36	52%
1986	18	105	21	80%
Totals	39	219	66	70%

Table 5 compares the helicopter survival rates for the years 1977-1979 and 1984-1986. The survival rates for individual years are fairly consistent until 1985, when 48 percent of all occupants died as a result of water mishaps. Because of the large differences in numbers of occupants carried by individual helo models, it is difficult to compare overall figures. For example, the 1985 survival rate was so low because of two particular mishaps. One H-53 crash killed all four crew members and two of the passengers on impact; the other passengers were lost at sea. One passenger was seen alive in the water clinging to wreckage, but had disappeared by the time rescuers arrived. This single mishap resulted in 17 fatalities. The other mishap was an H-46 that crashed in the water at night, drowning 12 passengers. These 29 fatalities in two



mishaps greatly increased the number of fatalities and lowered the survival rate for the year.

Helo occupants, especially passengers, have special problems, and all too often, they are unable to get out. It is believed that most of these fatalities drown while trapped in the sinking aircraft. However, survivors have reported inrushing water and darkness, even in daytime mishaps, as the biggest problems in escaping from the aircraft. These problems have often also been coupled with disorientation and inability to reach or open escape hatches.

Table 6

Helicopter [illegible] Fatalities
Cause

	CY 19[illegible]-1978 14 Fatalities	CY 1984-1986 66 Fatalities
Drowned	6 (43%)	18 (27%)
Lost at sea/Probably drowned	4 (29%)	5 (8%)
Lost at sea/Probably fatal impact		21 (32%)

Table 6 shows the drowning and lost at-sea fatalities for the two time periods. Once again, the vast differences in sheer numbers make comparison difficult. Many lives would have been saved if improved equipment and escape options had been available to these 33 helo occupants who most likely drowned during this six-year period. The helicopter emergency egress lighting system (HEELS) and the helicopter emergency escape device (HEED), which are currently being introduced to the fleet, should greatly improve the survival probability of those crewmen and passengers unlucky enough to be in a helo that goes in the water. In addition, the development of emergency flotation systems, crashworthy seats and fuel systems will also assist greatly in escape and survival.

The FLU-8 and SEWARS devices have virtually eliminated the entanglement, dragging and flotation problems faced by aircrews ejecting over water. The many lives saved due to automatic actuation proves, without a doubt, the vital need that existed. However, improved survival equipment and techniques are still needed in the helicopter community. The sooner improvements are made, the more lives will be saved.

Mrs. Thornton directs the Escape Systems Analysis Branch of the Aeromedical Division, Naval Safety Center, Norfolk, Va.

The Continuing Saga of the Dual-Service Anti-G Suit

By Lauretta Wormser

FOR the past several years, USN and USAF have worked to develop a standardized anti-G garment for use by both services. These efforts have continually been postponed by higher priority issues — until now. The dual-service anti-G suit is alive and well. A baseline design for joint service evaluation has been developed by the Naval Air Development Center (NADC) and Wright Patterson AFB.

The garment is a combination of the Navy CSU-15/P and the Air Force CSU-13B/P with some new features. The design of the suit is subject to change, depending on the results of test and evaluation scheduled during FY 88.

Cloth used in the CWU-27/P flight suit (MIL-C-83429 type II) will be used. Additional features include larger shin pockets with hook and pile closure, and a knife pocket and pile tape checklist retainer on the thigh.

The USAF bladder design, slightly larger than that of the CSU-15/P, will be used. Centrifuge tests have indicated no difference in level of protection or response time between the two designs. The hose length will be a minimum of 17 inches.

The Air Force seven size system, ranging from small regular to large X-long, will be used since it covers a broader range than the Navy system. The adequacy of the size system will be assessed during test and evaluation, and consideration will be given to either establishing a system for custom-made procurement or establishing new sizes.

Sizing adjustment will be accomplished through use of the current lacing system. The USN configuration, using elastic take-ups and zippers, will be used. The USAF thigh take-up feature, using a slide fastener to allow a losser fit during donning and preflight, will be included. This is not a seasonal sizing adjustment; the slide fastener must be closed during fitting and in flight to provide proper fit and achieve maximum G protection. The need for seasonal readjustment will be addressed during this program, with two options being evaluated: the development of a quicker seasonal readjustment feature and the recommendation that two g-suits be issued to each crewman.

The waist and leg closures will follow the USAF configuration with hooks and loops to facilitate zippers. The leg zipper will close from the top of the leg down. Although a quicker release feature is not included in the current design, the need for this will be closely evaluated.

Many questions have been asked about the use of hook and pile tapes in place of the zippers or laces. The tapes seem desirable because they allow ease of fit and quick readjustment.

However, a fleet evaluation in 1972 showed problems with the tape catching at the thighs, causing the suit to loosen and bunch at the knees. This caused discomfort.

Centrifuge tests were run at Brooks AFB during 1973, using various types of fastener tapes. The common hook and pile tape used on other flight equipment was found to separate at high g-levels and was considered unreliable at +8Gz. Higher strength tapes were found to be structurally reliable under g-loads; however, these tapes do not retain their gripping strength for long.

Some of these tapes are seriously degraded by ultraviolet light, becoming brittle and breaking. On other tapes, the hooks become embedded in the pile, causing a high resistance to separation. While this creates a secure bond, it also results in the hooks breaking off when the tape is separated, decreasing the strength of the tape.

Recent conversations with manufacturers of the tapes have confirmed our findings. While the evaluations mentioned above were conducted some time ago, the tapes have evolved very little. Special-purpose and high-strength tapes have been developed, but the problems with degradation of strength remain. For these reasons, we feel that the use of hook and pile tapes for closure or fitting purposes may present a safety hazard and is, therefore, not advisable.

In addition to establishing commonality of equipment between the services, one of the primary objectives of this program is to investigate the need for a personal issue leg restraint system vs. revision of the current aircraft installed system. The prototype g-suits to be evaluated incorporate channels that allow integration of the leg restraints with the anti-g suit. Two channels have been placed at specified locations on each leg to provide integration with the various ejection seats. The design and performance of these channels will be closely evaluated.

Alternate ways of integrating the leg restraints with the g-suit will be explored throughout the program. A decision on

PH1 Richard Pendergist

. . .The anti-g suits currently used by the USN and USAF are procured separately, yet are extremely similar in design and performance. In order to establish commonality of equipment between services, the USN and USAF are coordinating efforts on the development of a standardized anti-g suit to be used by both services. . .

whether to go with personal issue or aircraft installed leg restraints will be made based on results of FAILSAFE and other surveys, in addition to cost analyses of the various alternatives. The method of integration of the leg restraints with the g-suit depends on this analysis and results from wind blast and ejection testing.

The prototypes described above are currently being manufactured. Testing of these is scheduled for the latter half of FY 88. Two objectives are to be accomplished during this testing. The first is design verification. The second is the analysis of the leg restraints on suit and seat performance. NADC will conduct wind blast and ejection tower testing to verify effectiveness of the garment design and leg restraint system with each ejection seat type. The Naval Air Test Center will evaluate aircrew accommodation, fit, integration with existing equipment and compatibility with aircraft environments.

Upon completion of the testing, flight tests will be conducted to evaluate the anti-g suit under flight and air combat maneuver conditions. The Air Force will also conduct operational flight testing. Development of the suit is expected to be completed during FY 89, with initial operating capability scheduled for FY 90. We expect to produce a suit that meets the logistic and operational needs of both the Navy and Air Force. ◄

Ms. Wormser is a physical scientist at the Naval Air Development Center, Warminster, Pa. She is working on the development and support of aircrew personal protective clothing. She graduated from Cornell University in 1982 with a B.S. degree in Design and Environmental Analysis.

Where Does Your

ALSS Procured Through ASO

By Fred Gustafson

PHILADELPHIA's Aviation Supply Office (ASO) acts as the primary procurement agency for Navy and Marine Corps Aviation Life Support Systems (ALSS). Although some ALSS items are managed by the Defense Logistics Agency, Ships Parts Control Center and other services, ASO is responsible for most non-cartridge activated ALSS depot level repairable items (primarily ejection seat components), virtually all anti-exposure gear and personnel-related end items such as helmets, anti-G suits, parachutes, life preservers and rafts.

ASO's ALSS unit is responsible for the inventory management and technical support functions for stock numbered items and interacts with other ASO organizations responsible for allowance development procurement, material budgeting, cataloging and provisioning. The ASO ALSS unit is headed by Fred Gustafson and consists of both inventory managers and equipment specialists.

The inventory manager is the prime point of contact for the fleet and is responsible for:

— determining how many of a given item to buy.

— processing approximately 15 percent of fleet requisitions that are not filled by automatic computer referral.

— working with ASO purchase personnel and contractors to ensure procurements for ALSS are awarded and delivered on a timely basis.

— initiating commercial overhaul and interservice repair efforts and resolving problems hindering ASO's automatic repair scheduling systems.

— providing supply status to the fleet.

r Flight Gear Come From?

— acting as a general point of contact for supply problems.

The ASO inventory managers and supporting equipment specialists are at the very heart of the ASO operation. In the event of a supply shortage, they have the ultimate responsibility to satisfy the fleet requisitions.

If you run into problems you cannot resolve or just have general questions, contact the ASO ALSS team. The following points of contact may be reached at either autovon 442 or commercial 215-697 plus the applicable extension:

ALSS Unit
- Fred Gustafson, unit head X2111
- Inventory Manager Team:
  - Susan Antholz, team leader X4361 ejection systems
  - Beth Dooley, X4361 parachutes
  - Joe Bulvin, team leader X4360 flight clothing (Also has HEEDS, rafts, life preservers and most personal issue items)
  - Ken Cox, X4360 anti-exposure clothing and flight clothing accessories
- Equipment Specialist Team:
  - Frank Glanding, supervisor X4702
  - Bill Murphy, lead equipment specialist for ALSS X2108
  - ASO Customer Service "Hot Line" (Pass emergency MILSTRIP requirements or gets status of priority 2 and 3 requisitions) X3905
  - ASO part number requisition processing, Jim Hannigan, head X2556
  - Section H Allowance List, George Cureton X3190 ◄

Mr. Gustafson is head of the ALSS Unit, Aviation Supply Office, Philadelphia, Pa.

. . . Up until then I was cool and relaxed. Then the jumpmaster gave us the one-minute signal. At moments like this your life really does flash before your eyes, and you begin to think that maybe Mom was right about wanting you to go to law school . . .

Bailout

By HM1 Tim Brown

ONE of the briefs I give during aviation physiology training concerns bailout and parachuting techniques. For members of the VP community, bailing out of a P-3 is not high on their list of fun things to do. During a brief I frequently hear the comment, "I'll ditch the sucker before I'll jump out of it." Written comments on the course critique sheets have read, "Take the parachutes out of the P-3. They're not needed."

In talking with the crew members, I'm told that in a ditching or a crash landing, the crew and their survival gear will stay together; in a bailout, they would be scattered all over the place. People don't want to leave the cozy environment of the aircraft for a parachute ride.

Some of these responses seem to be based on instinct. VP crews have thousands of hours in a very reliable aircraft that they trust. They know what it will do, they are confident in its capabilities and performance record, and they are comfortable with it. Conversely, very few aircrew personnel have had any actual parachuting experience.

I suppose if you've never made a jump, you might have reservations about it, but a ditching may not always be your option. I'll describe what it's like to make a parachute jump; maybe that will help ease any concern you may have about doing it yourself.

NAS El Centro, California, was once home to the National Parachute Test Range. I was stationed there from 1974 to 1976 and had the chance to make a jump with the Naval Test Parachutists. It was scheduled for over water at the Salton Sea recovery area several miles from the base. That gave me the chance to make a jump and use the LPA and water survival techniques.

We made the jump from a C-117. Altitude was 5,000 feet and airspeed was 125 KIAS. I jumped with a static-line hook up; all I had to do was fall out the door and try and maintain a little form. My check jumper and I were the last of eight jumps scheduled for the day, so I had a chance to watch and pick up a few last-minute pointers. Our turn finally came, so with much bravery and no sense, I moved to the jump station at the back of the plane. I had my check jumper give my equipment a final check, attached the static line and settled in to wait for the jumpmaster to give us the go signal.

Up until then I was cool and relaxed. Then the jumpmaster gave us the one-minute signal. At moments like that your life really does flash before your eyes, and you begin to think that maybe Mom was right about wanting you to go to law school. My pucker factor got up to plus 10 or so, my heart started jumping around like a mouse in a paper bag, and I promised God all sorts of rash things if He would only end all this. God was busy somewhere else I guess because the jumpmaster gave us the 30-second signal, and I found myself standing in the door thinking I owned all the patents on stupidity. I didn't have to do this. I could back out at any time, but I'd never live it down if I did.

The jumpmaster gave the go signal. I hesitated for a fraction of a second, shut my eyes and ran out the door, swearing like the fleet sailor I was. They must have heard me all the way back on the flight line.

As I exited the aircraft, the first sensation I encountered was wind blast from the slipstream, followed immediately by tumbling and a sinking sensation, and then the shock of the parachute opening. Opening shock wasn't much more than a tug; I was pulled upright. All this took only a few seconds but seemed to last forever. It takes about four seconds for a parachute canopy to fully inflate, which is something to remember in a low-altitude bailout.

After the chute opened, I did a quick mental check of my body systems and detected no pain. Only then did I get the nerve to open my eyes and take a look around. This was a day for revelations. I discovered that I do not like high places! I love to fly and will get on board anything that defies the laws of gravity just for the chance to go, but I'm here to tell you that hanging in that parachute harness with nothing to hold on to, or to use as a solid reference, was one of the spookiest feelings I've ever had.

NATOPS procedures state that after you feel the parachute open, provided you have sufficient altitude, you should look up and check the parachute canopy for damage or malfunctions. You can't help but look up — it's reflexive. You're so happy to have stopped falling that you just have to look up and see if that thing is really there. I discovered that looking down was just too scary and that the task of checking out my parachute took my mind away from thinking about how far down the surface was.

Tim Brown

There was no problem with the parachute, so I set about taking care of the next immediate concern, flotation. I located the LPA inflation toggles with very little difficulty and gave them a pull. Only one side of the LPA inflated. I set a speed record locating the oral inflation tube and blowing that puppy up!

Things were starting to look a little better now that I had a good canopy and some flotation. My heart rate slowed to something below Mach numbers, and I felt my confidence start to return. I located and activated the steering lanyards and tested them out, and rapidly found out where the joy of parachuting comes from.

As you make your descent, there is no perception of downward motion. You feel as though you're just hanging in space; it's quiet, unbelievably quiet and peaceful. The only sound is the whisper of air passing through the suspension lines, and the view is spectacular.

There were three boats on station in the Salton Sea recovery area to pull the jumpers and equipment from the water. Our instructions were to steer for a landing a short distance from one of the boats so they could get to us quickly and recover the parachutes.

. . . After the chute opened,
I noted happily that I hadn't died of fright . . .

I was having so much fun driving the parachute around the sky and enjoying the view that I forgot all about the recovery boats. The frantic yelling and cussing of the boat crews brought my attention back from my fantasy world to the situation at hand. They had been chasing me all over the place, trying to figure out where I might eventually splash down. They were some distance behind me, so I made a hard turn to head back to their position. Naturally, I flew right over them.

Another turn seemed in order, so a little input on the steering lanyards put me back on my original heading. The boats had also started to change course, going in four different directions at once, all different from mine. The only reason I didn't get run over by one of the boats after landing was pure luck. I should have stayed predictable, rather than confuse the situation with my amateur steering.

As I descended, I had no stationary references to gauge my speed. As I got near the surface, this had changed rapidly. The descent rate was between 16 and 18 feet per second, and it was amazing how fast that seemed.

Right about then my heart rate started to rise dramatically again. I tried to remember to turn into the wind and set up for landing. I placed my feet and knees together, knees slightly flexed and toes pointed downward, grabbing the risers and not looking down. I tried to pick a spot on the horizon and stare at it, letting my landing come as a surprise. I wanted to be ready to release my chute as soon as I entered the water. I got most of it right. I couldn't tear my eyes from the surface of the water. On the way down I'd developed a bad case of target fixation and fascination. I forgot all about releasing the chute and if there had been any surface winds they would have had to chase me clear to Mexico.

Fortunately, I landed close to one of the recovery boats (through no fault of my own), so they were on top of me quickly. The parachute canopy started to sink immediately. Once the boat crew snagged my chute, I was able to remove the harness and climb aboard.

Even with the goofs that I made, it's like they say: "Any landing you can walk away from is a good one." That jump has had a lasting effect for me. It was a tremendous confidence builder. It's been more than a decade, but I still have no reservations about using a parachute if the situation should ever come up. You may never get to make an actual jump as I did, but don't write off bailout as an option. It may be the only one left to you. ◄

HM1 Brown is leading petty officer in the Aviation Physiology Training Unit, NAS Brunswick, Maine. He works with P-3 squadrons. The parachute jump he describes was his first and last.

Oh Baby, It's Cold Outside!

By Tara Larson

WHILE in the better stores, Calvin Klein may be showing camel hair and cashmere, and Ralph Lauren may be heavy on the preppy and western look; the Navy remains steadfast with its standby of Sage Green, color No. 1565 Nomex.

To prepare for the winter, you should be aware of the clothing available for use in cold temperatures. Knowing what's available and the proper means of layering clothing can save your life.

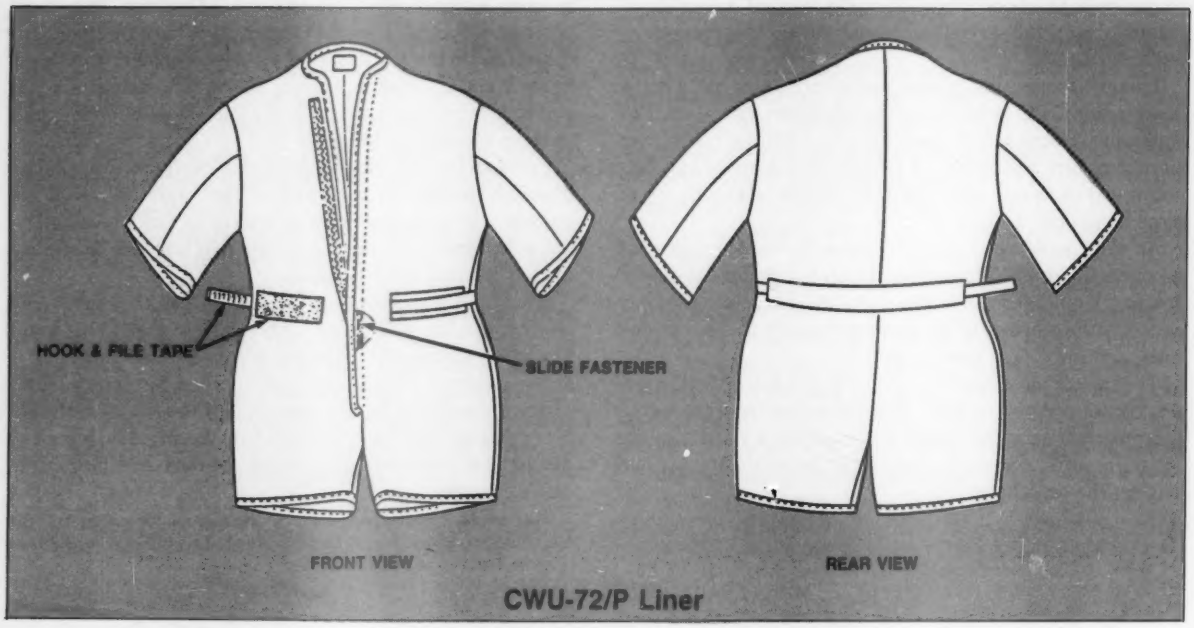
Short exposure to extreme cold or prolonged exposure to cold result in two afflictions, frostbite and hypothermia. Frostbite is the freezing of the skin. Hypothermia is the lowering of the body temperature. Frostbite can occur without hypothermia when the extremities do not receive enough circulation or insulation. Both can occur at the same time with prolonged exposure to below-freezing temperatures. Both can be prevented by wearing appropriate attire.

Layering of clothing gives thermal insulation by trapping air within and between the fibers and layers of the clothing being worn. The body heats this trapped air, and it becomes an insulating barrier. Therefore, the more layers, the greater the volume of trapped air and the warmer the body will remain. The layers should slide easily against each other to facilitate movement and should not restrict circulation.

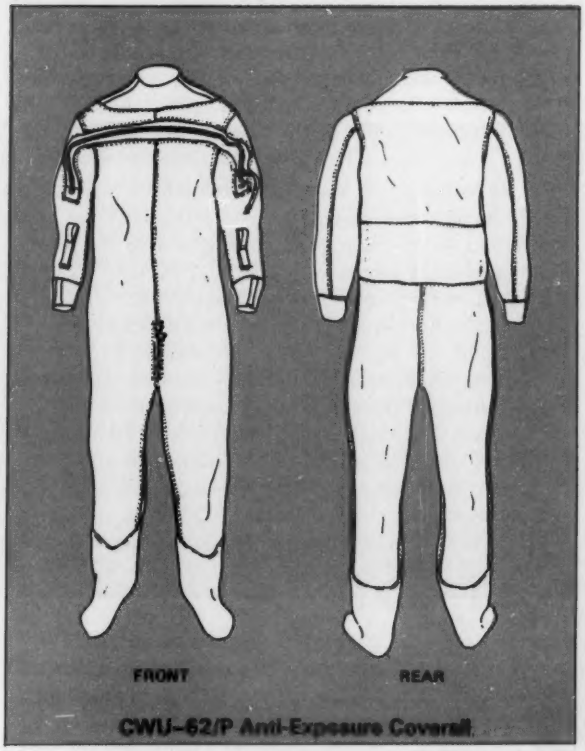
Starting with the bottom-most layer of an anti-exposure assembly for cold weather, an aircrewman typically dons the CWU-43/P and CWU-44/P cold weather underwear. They are designed to provide thermal insulation and are constructed from high-temperature-resistant (Nomex) material. The drawers are full length. They have a boxer style closure, elastic waistband and elastic stirrups. The undershirt has full sleeves. Cuffs, neckband and ankles are of a tight knit weave to fit snugly.

Staying with the basics, you will probably be donning a pair of wool socks. In cold weather, wool is definitely your best choice. Wool provides a double layer of warming power. It provides insulation by adding a layer of still air next to the body, and actually produces heat by absorbing moisture vapor from your body. In comparison, cotton is great in warm weather when its absorption of excess water aids in cooling our bodies, but in cold weather this evaporative property could be detrimental.

Over the cold weather underwear, you may want to put on the CWU-72/P Liner regardless of whether you are flying over land or water. This one piece garment is available in nine sizes. The liner should be worn over the recommended underclothing and under the proper coveralls. The liner provides a layer of thermal protection through its layer of 100 percent olefin microfiber (Thinsulate) thermal insulation sandwiched



This one-piece CWU-72/P Liner is available in nine sizes.



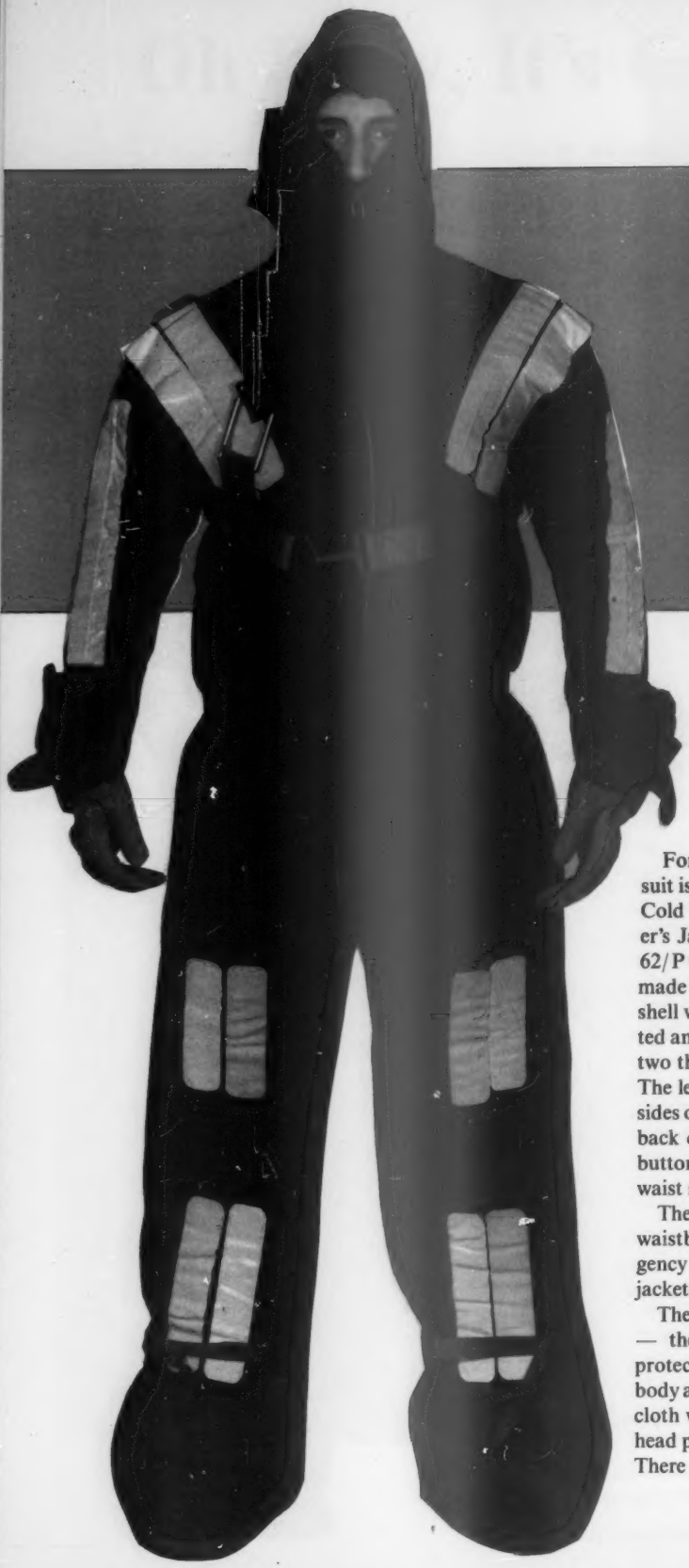
The CWU-62/P is a continuous-wear garment that comes in 12 sizes.

between two layers of Nomex fabric.

If you are flying over water, the next layer is the CWU-62/P Anti-Exposure Coverall. This is a one-piece coverall available in 12 sizes. It is designed as a continuous-wear garment that will keep the wearer dry in the event of water entry. The fabric of the coverall is Nomex, laminated to polytetrafluorethylene (Goretex) backed by a Nomex knit. This combination provides fire protection while preventing water from entering but permitting bodily produced moisture vapor to pass through, thus minimizing heat and moisture buildup. Due to the nature of the fabric, the coverall should not be worn in direct contact with the skin. The neck seal and wrist seals are manufactured from natural rubber, flocked on both sides. The entrance opening across the chest and the relief portal are sealed with water- and pressure-sealing slide fasteners.

As an extra precaution, be sure to take with you the HGU-32/P Anti-Exposure Hood and HGU-12/P Anti-Exposure Mittens. Both are designed to provide protection for the head and hands in low-temperature conditions. They are constructed from two layers of polyurethane-coated nylon cloth, and the layers are heat-sealed around the edges. The hood and mittens are inflatable and equipped with an oral inflation valve. The hood has a hook-and-pile tape closure. Since much of the body heat is lost through the head, the hood is an extremely important life support system. Continued

This CWU-62/P Anti-Exposure Coverall is for over-water flights. It will keep the crewman dry in case of water entry and is also fire-resistant.



Garment	Mil-Spec
CWU-43/P Drawers	Mil-D-85040
CWU-44/P Undershirt	Mil-D-85040
CWU-72/P Liner	Mil-L-85701
CWU-62/P Coverall	Mil-C-85633
HGU-32/P Hood	Mil-H-81843
HGU-12/P Mittens	Mil-M-81844C
CWU-18/P Trousers	Mil-T-83385
CWU-45/P Jacket	Mil-J-83388
Winter Flyer's Hood	Mil-H-85037
CWU-64/P Coverall	Mil-C-87230
HAU-6/P Gloves	Mil-G-38227
Inserts	Mil-G-835
CWU-60/P Coverall	Mil-C-85763

Soon aircrew members will have this new CWU-60/P Quick Don anti-exposure coverall.

For the times when use of a continuous-wear anti-exposure suit is not required, you could wear the CWU-18/P Extreme Cold Weather Trousers and CWU-45/P Cold Weather Flyer's Jacket. These pieces can be worn instead of the CWU-62/P when winter flights are not over water. The trousers are made of Nomex materials throughout and consist of an outer shell with reinforcement patches on the seat and knees, knitted anklet cuffs and a quilted lining. There is a knife pocket, two thigh pockets, two hip pockets and side pass-throughs. The leg openings are closed with slide fasteners on the outer sides of the legs. A waist adjustment strap is positioned on the back of the trousers. The trousers also have belt loops and button-on elastic suspenders. The trousers are available in waist sizes from 28 to 46 inches.

The CWU-45/P Jacket has an outer shell with wristlets and waistband of Nomex material, and a quilted lining. An emergency marker panel pouch is included with the jacket. The jackets are available in sizes small through extra-large.

The jacket does not have a hood, but there is one available — the Winter Flyer's Hood. It is designed to provide protection for an aircrew member's head, neck and upper body and is worn under the jacket. It is constructed of Nomex cloth with an alpaca pile cloth lining. The front edge of the head portion is faced with a synthetic fur ruff for protection. There is a front slide fastener opening, a hood-opening slide

fastener, a drawstring for adjustment of the head portion and hook-and-pile fastener tape closures.

If you prefer a one-piece coverall rather than the trousers and jacket, your wish will be granted. The Navy is purchasing the CWU-64/P Winter Flight Coverall recently developed by the Air Force. This coverall is also constructed from Nomex with a layer of aramid batting or Thinsulate for warmth. Features include a slide fastener front closure, expandable back section, hook and pile fastener adjustments for the sleeves and a slide fastener on each leg inseam. The coverall has a concealed hood in the collar, chest pockets, sleeve pockets, thigh pockets and lower leg pockets.

Of course, hand protection for all of these assemblies is important. The HAU-6/P Lined Gloves are donned in place of the fire-resistant flyer's gloves. The gloves have brown knitted wool and nylon inserts and brown, intermediate-weight leather glove shells.

Next year, aircrewmembers flying in P-3s, C-2s and C-130s will be able to jump into the CWU-60/P Quick Don Anti-Exposure Coverall. This suit is a one-piece coverall constructed of a gas-expanded, closed-cell neoprene foam body, mittens, boots and face seal, Goretex hood and neoprene-coated cotton gloves. These neoprene gloves and the more protective mittens are hooked together so that one can slide into the other and provide needed dexterity prior to ditching. Both are attached to the sleeve ends. The outside of the coverall has removable reflective tape to aid in search-and-rescue operations. For maximum insulation and warmth, the CWU-60/P should be worn with the Cold Weather Trousers and Jacket and appropriate underclothing.

These items may not be in GQ or Vogue, but by using them, you will be around to take a look at what's new for the next season. ◄

Tara Larson is a physical scientist with the Air Vehicle and Protective Systems Division at the Naval Air Development Center, Warminster, Pa. She has a degree in textiles and clothing design from Cornell University.

We're Too #*@@*# Safe!

By Lt. M.W. Jones

WE must be the safest organization in the world. And when you consider what business we're in, it's ironic, isn't it? But are we **too** safe? That is the question. Take my community, for instance.

The Navy has gone overboard and is buying millions of dollars worth of equipment, the sole purpose of which is safety. Can you believe it? None of this equipment aids the tactical situation! We H-3 drivers know it could be better spent there. But Oooh nooo, we have to have all this "stuff" that protects us from head to toe and is supposed to help us to safely depart a mishap scene whether the helo sinks or not. The Navy has foolishly gone out of its way to take all these hard-earned tax dollars that could have been spent on exciting new high-tech gadgetry and instead has bought these unappreciated safety devices that will only be used once, if ever.

For instance, take this new air bottle device that the Navy decided we just had to have — HEED (Helicopter Emergency Egress Device). Here we have a relatively small air bottle that holds all of two to four minutes of air for underwater breathing. Holy cow! Once that thing is stuffed into your survival vest, you feel like a vertical blimp. The H-3 never goes in the drink. Besides, if mine ever does, I don't plan on sticking around long enough to enjoy a few breaths of stale compressed air. Do they really think I need a couple more pounds of junk holding me down if I'm under water? Besides, we're helo jocks — not frogmen!

How about those nomex flight suits? Whoever designed those things sure never had to sit Alert 5! Any aviator would choose a cool, light-weight, summery (short-sleeved maybe?) cotton flight suit over a hot, scratchy, flame retardant model. Remember what they feel like when they're new? Yuk! And about the time you get it broken in, they want you to trade it for a new one. And while I'm on the subject, their color schemes aren't too great, either. Why not something flashy to attract the chicks at the O'Club? And the gloves are even more nonfunctional. Doesn't the Navy realize that 90 percent of its operations are in the tropics? Besides, they make it hard to flip switches on our gadgets and "feel" the aircraft.

The helo community has sought and procured too many of these so-called improvements. On the aircraft itself, they have added this do-hickey called HEELS, the Helicopter Emergency Egress Lighting System. Here we have a battery-operated device that illuminates the outline of the windows and doors in flourescent green when the rotor coasts down. Hey, I'm sorry, but the disco scene is out. If it's a pitch black night and suddenly the only thing I hear is millions of gallons of ocean pouring into the helo and my head is wet and my tail is dry, the only thing I'm going to be seeing is my life passing before my eyes. If they want me out, why not just take off all the doors and windows? Are they afraid I'll fall out despite the web of buckles and straps holding me in my seat? Remember the helo dunker at water survival? Did *that* nightmare have doors and windows installed?

And how about that Emergency Lubrication System (ELS) installed some years back? This system is supposed to allow you those extra minutes to find a safe landing site. I don't know about you, but when the transmission starts spitting out it's life blood like a burst artery, I think the aircraft is trying to tell me something, and it's not that it wants to take another lap around the block.

Let's face it folks, who needs all these safety features? Aren't we supposed to be rough-and-tumble like John Wayne? Next thing you know they'll be telling us death, destruction and injury are unacceptable. ◄

Lt. Jones flies SH-3Hs with HS-8.

. . . A few years from now there will be new fixed-wing and rotary-wing aircraft helmets. Farther down the road may come a common helmet or a common helmet shell. . .

It's All On Your Head

By Lt. Ryan R. Hitzeroth and
Daniel J. Schmidt

BEHOLD the valiant naval aviators as they stride to their trusty flying machine. Clad in fire-resistant cloth, surrounded by inflatable bladders and survival equipment, they feel good so far. But then they reach into their green bags and draw forth their protective shields — their flight helmets. Most aircrew view the helmet as a vise to be worn on the head for a few uncomfortable hours.

Increased performance capabilities of modern aircraft and helmet-mounted devices (HMDs) press the need for a lighter, better-balanced helmet. Longer missions demand a comfortable fit. Increased crash worthiness and higher sound levels of aircraft call for better impact protection and sound attenuation.

What the fleet wants is a light, comfortable helmet with an optimum center of gravity. What we now issue are aircrew helmets with improvements being made. A few years from now there will be new fixed-wing and rotary-wing aircrew helmets. Farther down the road may come a common helmet or common helmet shell.

Helmet retention has been improved for both the fixed- and rotary-wing aircrew helmets. The SPH-3C rotary-wing aircrew helmet was given a new inner suspension system (ACC 427). The HGU-33/P series fixed-wing aircrew helmet was modified with a nape strap (IACC 457). Form fit liners have improved comfort, stability and retention for the HGU-33/P series and will soon be available for the SPH-3C (ACC 490).

In response to fleet requests, the Navy has authorized dual visors (PRU-36/P) for the E-2C (ACC 445), C-2A (ACC 477) and T-34C (instructor pilots only, ACC 516). Camouflage helmet covers are authorized for the HGU-33 series (single visor, ACC 499) and SPH-3C (ACC 515) to reduce glare in the cockpit, canopy scratching and visual detection in a survival evasion scenario. There are several ongoing improvement programs. An active noise reduction (ANR) system will reduce helicopter noise levels at the ear. We are evaluating the electret microphone for boom mike and oxygen mask applications; it incorporates the amplifier into the microphone assembly, reducing interference. The helmet modularity program helps standardize aircrew helmet configurations throughout the Navy and improves airframe-to-airframe compatibility. The dual visor (PRU-36/P) used by S-3A/B aircrew is being evaluated. Improved laser eye protection capability is also being studied.

Remember, for aircrew helmets to function as designed, an initial fit and periodic adjustments are necessary. If your helmet is too loose, too tight or develops "hot spots," take it to the PRs for repair. It may cost you a flight for downed gear, but it will benefit you in

for repair. It may cost you a flight for downed gear, but it will benefit you in the long run. "Fine," you say, "but when do I get a new helmet?"

The Air Force has completed development and authorized procurement of the HGU-53/P Lightweight TACAIR Helmet manufactured by GENTEX. NAVAIR and NADC have evaluated a slightly modified Navy version of this helmet through a fleet assessment, and results of the fleet assessment show this helmet to be an unacceptable replacement for the HGU-33/P. Currently a modified version of the HGU-55/P is being evaluated for replacement of the HGU-33/P. NAVAIR and DADC are conducting East Coast and West Coast evaluations during fiscal 1988 with an estimated IOC in fiscal 1991.

NAVAIR and NADC have recently completed an East Coast fleet assessment of the British-made Alpha helmet for rotary wing application. The assessment provided favorable data for the Alpha helmet as a replacement for the SPH-3C. The Alpha is lighter than the SPH-3C with a significantly reduced profile. Comfort and stability are provided via a wide range of helmet sizes, contoured fitting pads and an integrated chin-nape strap system. Various visor configurations plus CBR and night vision goggles compatibility are part of the Alpha helmet. NAVAIR and NADC are testing the Alpha on the West Coast during fiscal 1988. IOC for the Alpha could be as early as the fourth quarter of fiscal 1989.

NAVAIR and NADC have also begun evaluation of a proposed rotary-wing version of the HGU-53/P series helmet. This helmet has increased impact protection and sound attenuation compared to the fixed-wing version. Helmet shell size will be increased to accommodate the extra protection; the estimated weight is 2.5-3.5 pounds. Testing could start during fiscal 1988. Due to the recent receipt of this proposal, the IOC for this helmet configuration would probably be after the IOC for the Alpha helmet.

Now let's look into a crystal ball shaped oddly like an aircrew helmet. The path for aircrew helmet development has many obstacles. It yearns for integration but is often detoured by "mission specifics." In the world of the ATF and LHX, the aviator will be flying faster, going lower and pulling harder than ever before. He will receive flight, navigation, and targeting data, and will attack at night, through HMDs without looking inside the cockpit. He must be protected from chemical, biological, radiological and laser hazards. It's a tough job, but can one helmet do it? Maybe.

Light materials and optimized contours can improve the helmet of the future. Integration of the oxygen mask into the helmet assembly would greatly improve center of gravity, thereby increasing stability and retention. It's not what the helmet is made out of but where and what you strap on it that causes many of today's aches and pains. The problems with making a common fixed- and rotary-wing helmet are mainly trade-offs in impact protection and sound attenuation versus weight. Rotary wing aircrew require greater impact protection and better sound attenuation at low frequencies than fixed-wing aircrew. This makes for a heavier, bulkier helmet for the rotary-wing crew. ANR and better impact materials could make a common helmet a reality. With the selection of the HGU-53/P series and Alpha helmets, and through evaluation of emerging technologies, NAVAIR and NADC are on the path to the aviation helmet of the future. ◄

Lt. Hitzeroth is an S-3 NFO from the West Coast and is a program acquisition manager in the Crew Systems Division at NAVAIR. Mr. Schmidt is an aerospace engineer in the Personal Protection Systems Branch at NADC.

Helmets, like most flight gear, generate conflicting opinions as to which design features are most important. Unless the fleet expresses its opinions on the system, various communities may find themselves with a helmet they don't want. Find out what's coming, see if it's what you want, and make sure your concerns and needs are heard. — Ed.

Making

By Lt. Brian D. Swan, MSC, and
HM1 (PJ) Joe K. Falkenberry

What is the best way to signal a SAR aircraft or other rescuers? The answer can be a lifesaver. In peacetime or in combat it is vital to use correct survivor signaling techniques.

You must avoid tipping off an adversary who may be within sight or radio range. Knowing how the enemy could locate you is being one step closer to a successful evasion evolution.

The area of signaling equipment and procedures is where this type of combat discipline is extremely important. In a survival situation you should ask yourself the following questions:

"Who do I want to signal?"

"Will signaling compromise my position?"

"Which signaling devices would be least likely to attract enemy attention?"

"Should I even try to signal at this time?"

If you decide to signal, the choice of signaling device is crucial: radios, flares, strobes, mirrors and fires. The number of choices or combinations seems almost unlimited, until you

the Same Mistakes

. . . If you decide to signal, the choice of signaling device is crucial. . .

look at the considerable drawbacks of many options. Here are a few considerations for each device:

MK-13 Day/Night Flare. Announces to *any* passing aircraft your exact position. Lingering orange smoke is also a giveaway in a close, jungle setting.

MK-79 Pencil Flare. Not only gives away your location to passing aircraft, but also helps ground units find your location as well. Also, firing the flare is noisy.

Sea Dye Marker. Leaves a long-lasting, highly visible slick of green on any water surface. In the open water, this slick will follow you as long as the marker is in the water. In a river or stream, it will pinpoint your location on the bank. In snow, it will be very difficult to cover, as it will bleed into fresh snow placed on top of it.

Strobe Light. Identifies you to *any* passing aircraft. If used without flashguards, it can be easily confused with muzzle-flashes. Also, it is not very effective in daylight hours.

Signal Mirror. Although only fully effective on a sunny day, it allows for discreet, directional signaling to a friendly aircraft.

PRC-90. It may be your "best friend" in a peacetime survival scenario, but it can be your worst enemy in an evasion scenario. The enemy *knows* the frequencies. Anytime you broadcast, you can be certain that the enemy is listening. The only question is who will get to you first — a helo from the battle group or an enemy patrol two miles away? Given today's directional finding technology, less than 20 seconds of broadcast time is all it takes to triangulate your position. If you *do* have to use the radio, make certain that your broadcasts are as brief as possible. Don't broadcast more than once from any given location.

URT-33. This radio provides a constant screaming beacon from the moment of ejection until it is manually shut off. Yes, the enemy can (and will) monitor the frequency.

The options that are so numerous in peacetime become very limited in a combat-evasion scenario. How will *you* handle this type of situation?

The ideal signaling situation is using a directional signal, pointed specifically at a friendly aircraft (i.e., signal mirror or flashlight).

Radios, because they are monitored, are probably best saved for when a rescue aircraft is in sight. If needed before that, transmissions should be kept to as few seconds as possible. Secure the URT-33 as soon as possible after landing.

Avoid the use of flares and sea dye markers unless a rescue aircraft is either in sight or *known* to be on the way. Always use flashguards *if* the strobe is being used. Always secure a strobe if enemy aircraft are in the area.

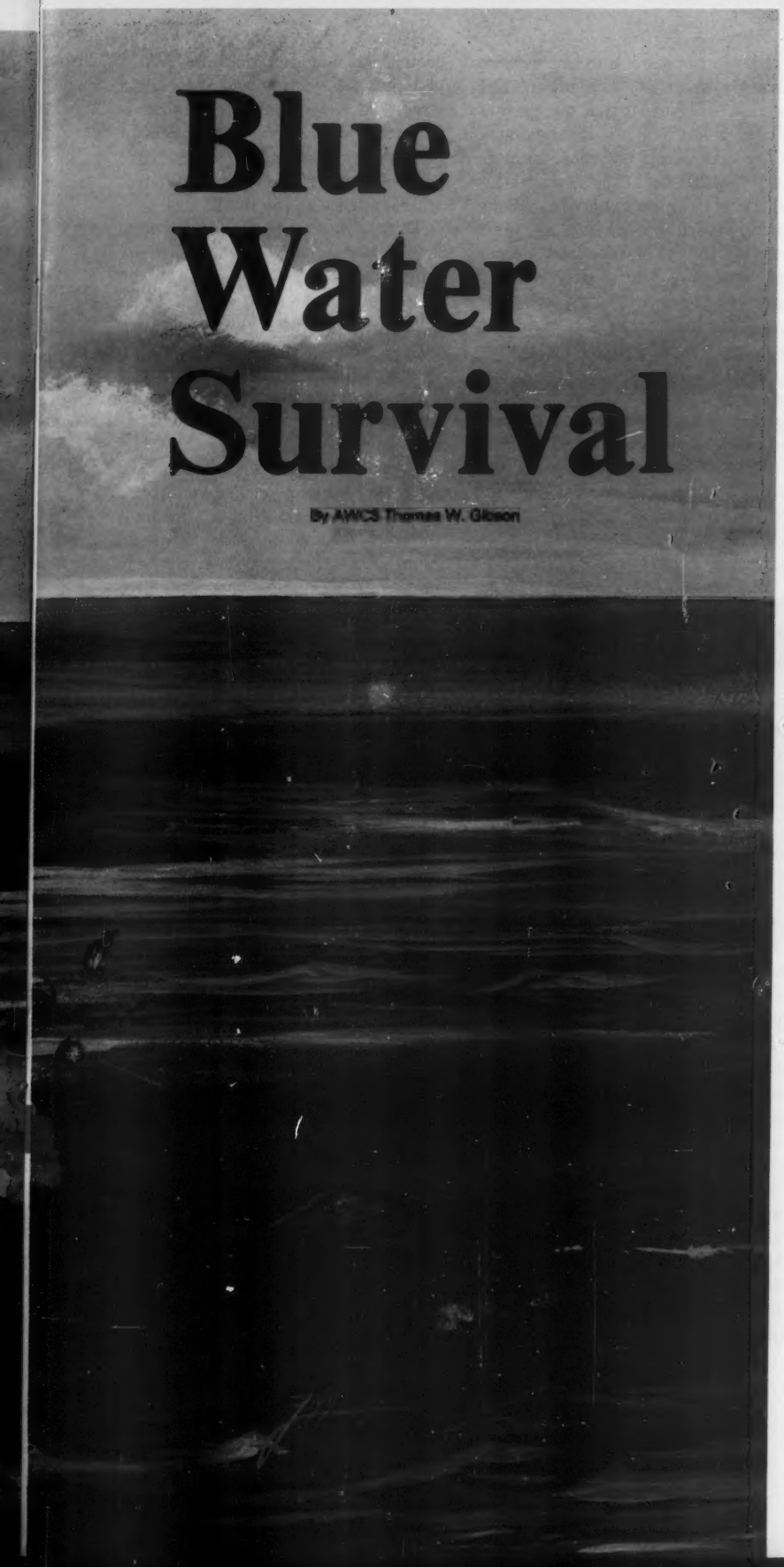
There are many more considerations that are common sense. Once you start thinking along these lines, you will see that whole new rescue strategies must be planned. The time to start thinking about these factors is right now. ◄

Lt. Swan, a naval aerospace physiologist, is in the Aviation Psychology Training Department at NAS Miramar, San Diego, Calif.

HM1 (PJ) Falkenberry is an instructor in the department. He is a graduate of the Aviation Physiology Technician School, NAS Pensacola, Fla.

Blue Water Survival

By AWCS Thomas W. Gibson



IT was about 0200 when I saw the rough flight schedule: a 1200 brief, 1400 go, 3.5 hours, SSC and bombing in the War Hoover. Best part of all, we would miss GQ and the gas mask drill.

The brief was normal: the standard stuff about the mission, being safe and emergency procedures. It was what we had all heard dozens of times before. Sure need to liven up those briefs a little. We decided to walk five minutes early so as to be on the roof prior to GQ. I went to preflight and had some chitchat with the maintenance guys.

As I got to the deck, I realized that for the first time in three weeks the sun was out. I remember thinking that this hop was truly a genuine "Navy good deal."

After normal starts and checks, we taxied up to the cat for a normal shot. After an hour and a half with all systems up, our SSC sector had been totally searched. I mentioned to the pilot that we had completed our sector.

"Great, let's go bomb," he responded.

The throttles were pegged, and the nose came up to what seemed to be about 30 to 40 degrees. That's when the problems began. Passing about 2,500 feet, with an estimated air speed of 180 to 200 knots, the pilot initiated a left aileron roll. With the roll about 90 percent complete, the copilot said "Uh oh." What felt like six Gs, came on the plane, and the Viking started to buffet. The last thing I heard was "Punch out! Now!" Then I felt the seat fire. The time from the seat firing until I was in the water was less than three seconds. I never had a full chute. My SEWARS worked as advertised, as did my FLU-8. Thank God for that, as I was badly out of ejection position in the senso seat when it fired. My right arm was hurt, my legs were very sore, and my vision was blurry. About a minute had gone by when I realized where I was and what had to be done.

First order of business, hook the lobes. Next, get the raft out. I pulled the seat pan handle and reached behind to pull the raft out. It didn't open! The para pack was still there! Right about then I heard the tacco yell for the pilot; I listened for an answer, and there was none. The second time he called, I answered. I asked him how he was. He

said that he was in good shape.

"Can you see me?" I asked.

"Yeah," the tacco replied.

"Can you come over here? I've got a couple of problems," I said.

"Sure," he said. Ten minutes passed, and I asked him where he was.

"Well, I'm having a few problems too," he answered.

"OK, I'm coming to you," I said.

"Roger, just come straight from where you are."

Five minutes of paddling later, "You're swimming in circles."

"OK, tell me which way to go."

It took us 15 minutes to get together in calm seas. Once together the tacco started to work on getting my raft out, while I used my good arm to hang on to his raft. After about 10 minutes of that, we decided that it was going to be a while before we could get it open, and the time would be better spent trying to contact someone to get the SAR effort going. No one knew we were down. The tacco got out his trusty PRC 90. It was dead. It had checked good on deck.

I handed him mine with a very worried "don't drop it!" It worked for about 20 seconds on beacon, and then it died too. Our luck was changing. That 20 seconds was just enough for one of our squadron aircraft to pick up the beacon and get a DF cut. Hearing their engines overhead was indeed comforting. They spotted us! We sat back and relaxed, as now it was just a waiting game. About 40 minutes later, I heard props. I thought it was a helo. It was a P-3. By now I had stopped shivering, and that worried me. I was also worried about being drowsy, so I would listen for the sound of the aircraft for something to do.

I had a couple of thoughts at this point; although the water felt cold, I thought, "Glad I'm not bleeding, so I won't draw sharks." I had no idea that I had two good-sized cuts, one above my eye and one on my chin. I was, indeed, doing a fine job of bleeding. Then I thought the cavalry must be on the way, or else that P-3 would have dropped us a big raft. The next pass the P-3 dropped the big raft.

This was not good. It meant we were probably there for the night. The question was how to tell my partner without giving him the same sinking feeling that I had. While all that was going through my head, he was in his raft trying to figure out how to tell me that we needed to swim over 500 yards to the raft the P-3 had dropped. He was also wondering how to do it without giving me the same sinking feeling he had. After some thought I said, "You know, sir, I would really like to get out of the water."

He said, "Roger that. Let me spot it and we will head on over." For the next two hours, we paddled to reach the raft. We stopped every few minutes to rest, get our bearings and press on. The tacco kept telling me which leg to kick harder so that I would head in the right direction, as my vision was still blurry.

We had finally gotten close to the raft. It was about 10 yards away when I heard the helo. I looked just enough to see where the helo was and then told the tacco that I was moving away from the pickup. I signaled a thumbs down to the helo because I was going to need help with the hoist. The swimmer was there in an instant. He asked me how I was and checked to make sure I was ready to go up, and away I went. A couple of minutes later, my partner came up, and we were finally en route to the ship.

There were several lessons to be learned from this episode.

First: *Everything was far more difficult than I had expected it to be.* The seas were calm at the time of the crash but picked up to a sea state two. We had to work hard at everything we did, and it took a great deal of teamwork. If the seas had been higher, we would have had a much harder time. I doubt if we could have even gotten together. The water temperature was 72 degrees but felt much colder.

Second. *I always knew it could happen to me.* I had practiced survival situations in my mind; however, I had always practiced a scenario of being in basically good shape. I figured I would be the guy playing "John Wayne," swimming around helping everyone else. When you practice ejection and survival in your mind, use several different scenarios, each one with varying degrees of difficulty. Try getting to your survival gear with one arm and the lobes inflated. It's not as easy as you think!

Third: *The thought of not having a raft available had never crossed my mind.* The seat pan was damaged on water impact and would not open. Think of what you can do if you don't have a raft. If your survival partner's raft is good, try trading places with him at given time intervals. Of course, this is predicated on whether or not you have a survival partner.

Fourth: *When our squadron aircraft flew overhead and signaled that he had seen us, we relaxed.* That was probably the worst mistake we made! Until that point we had been very busy trying to improve our situation. Since our PRC 90s didn't work, we could not communicate with the aircraft. We didn't have any idea what the plan for pickup was. *You must keep trying to improve your situation and continue this effort until you're in the helo or small boy.* It's not over until it's over.

Fifth: *Talk with the helo SAR crews.* Find out what their policy for rescue is. Our helo squadron's policy was to put a swimmer in the water no matter what the situation is. When I signaled thumbs down, the pilot of the helo thought I was in real trouble and pressed hard to get there immediately.

Sixth: *Accidents will happen when you least expect them.* Always be ready for anything. So many things went wrong, things that could have been catastrophic to our survival situation. Things that I had never thought about. I do now!

Finally, the one thing that helped us the most was the fact that we both had just attended aviation physiology and water survival training. It turned out to be the most important thing we had done. I will never again look at those two schools as a requirement to stay current. Instead, *I will look at them as a requirement to stay alive.* They really helped!

AWCS Gibson is a former S-3 aircrew instructor. He has been with the VS-38 Fighting Red Griffins for the past four years and has logged over 1,800 S-3A hours.

You Can Make Your Luck

By Lt. Michael White

IT was the second day of CQ operations aboard the CVN in preparation for the final phase of work-ups. It was early January, and after a chilly first day of ops just off the coast of NAS Northeast, the ship transited to the Gulf Stream to improve conditions on the deck. In the Gulf Stream the sea surface temperature was up to 78 F with the air temperature about 50 F, quite an improvement from the 40 F seas and 30 F air temperatures right off the coast.

Although temperatures in this area were well above the minimums for exposure suits, our squadron was still wearing them in case a crew had to bingo and fly over the cold water. I was one day away from requiring two night traps to remain current, so the press was on for me to finish up.

After a long morning of waiting around in my dry suit and flight gear for a hot seat man-up, I finally got out and logged my day traps. I then grabbed some chow and was back to brief for my night trap. The cold air blowing over the Gulf Stream had created some low cloud cover (ceilings 500-700 with numerous higher layers), and the deck was pitching 10-12 feet. After a thorough brief, I awaited my turn to man up. We had already bingoed one aircraft to the beach, and the number of bolters and pitching deck wave-offs had me a little uptight, especially since it had been almost two months since my last night trap.

My jet was a cold start. I learned from maintenance that it was in the hangar, so I went down and preflighted what I could as the jet was being moved to the elevator. The plane captain was riding the brakes, so I walked out on the elevator alongside the A-7.

Just as the blueshirts chocked the tires, a huge wave broke over the elevator. It crested all the way over the fuselage, soaking the aircraft and everyone around. The hangar crew jumped into action, chaining the jet down as the plane captain closed the canopy and joined me back in the hangar. The aircraft rode alone to the roof.

While I went to the paraloft to get my SV-2 checked after the soaking, the maintainers on the flight deck dried out the cockpit. When I arrived, the jet was ready to go. Thanks to the exposure suit, only my hands and face got wet and even with a windchill factor of 40 F on the deck, I didn't feel too cold. The trouble-shooters were replacing one box in the cockpit, and everything else appeared to be working after the saltwater dousing. Start-up was normal, so I closed the canopy and tried to get warm. The beginning of this evolution had been rough, but things were looking up.

I shot off cat 2 expecting a turn downwind but instead got the call "Clean up, check in with marshal button 16." Another airborne respot! I checked in as instructed and proceeded to climb to 16,000 feet and marshal. On the way up I began to get cold since the air conditioner kicked in at the higher power setting, so I turned up the rheostate. No change. I checked manual air conditioning. Still no change. The air conditioner was stuck full cold.

Canopy defrost helped some, but my hands were uncomfortably cold, even with gloves on. Just what I needed — my first night trap in two months, bad pitching deck and I was freezing! With a full bag of gas, I might have been held an hour or more, but fortunately, I was at CQ weight and only held about 10 minutes. By now I was really feeling the cold. I began the approach and broke out about 700 feet, in sync with the deck for the trap. That trap was the best thing that happened that night.

I can't help wondering what kind of shape I would have been in had I not been wearing the exposure suit. After all, temperature conditions at the ship didn't require it. My hands and face were cold enough without the rest of my body being in a wet flight suit. What if I had been sent to the tanker to hold for another hour, or had taken a couple of wave-offs? Worse yet, what if I had to bingo and climb to 30,000 feet or so? There are a lot of possibilities, most of which were not very desirable. I don't think our skipper had a case like this in mind when he directed us to wear our exposure suits, but I'm lucky that he had considered some of the possibilities. Sometimes you can make your own luck. ◄

Lt. White is weapons training officer for VA-72, an A-7E squadron based at NAS Cecil Field, Fla. He has 750 flight hours and 115 traps.

AMSO-GRAM COMIX

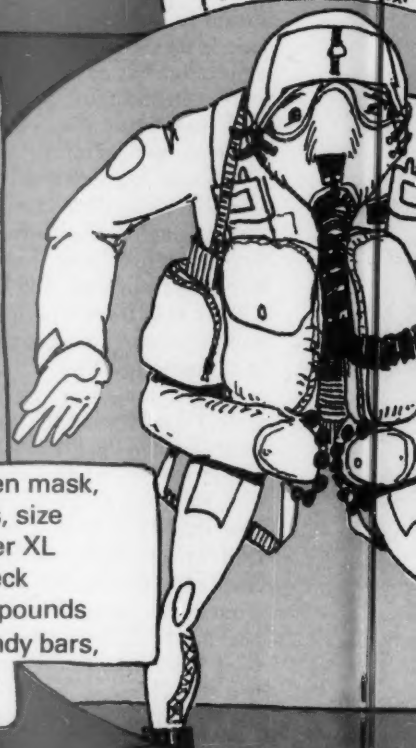
By Lt. T.J. Wheaton
NAS Key West, Fla.

HOW TO PRE-FLIGHT YOUR GEAR

Starring
S.H. AVIATOR

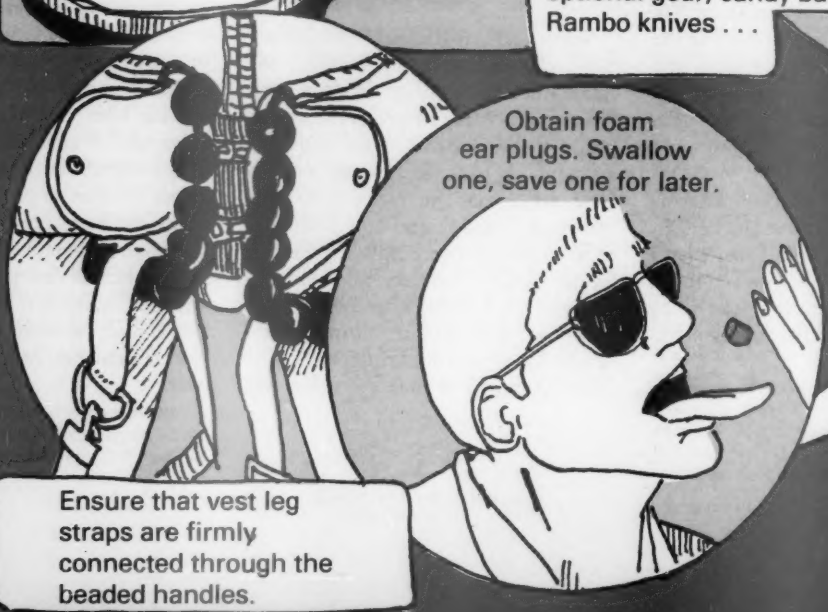
Discard approach plates/pubs from the helmet bag. (FOD hazard!)

Golf shirt, sure to enrage PR.



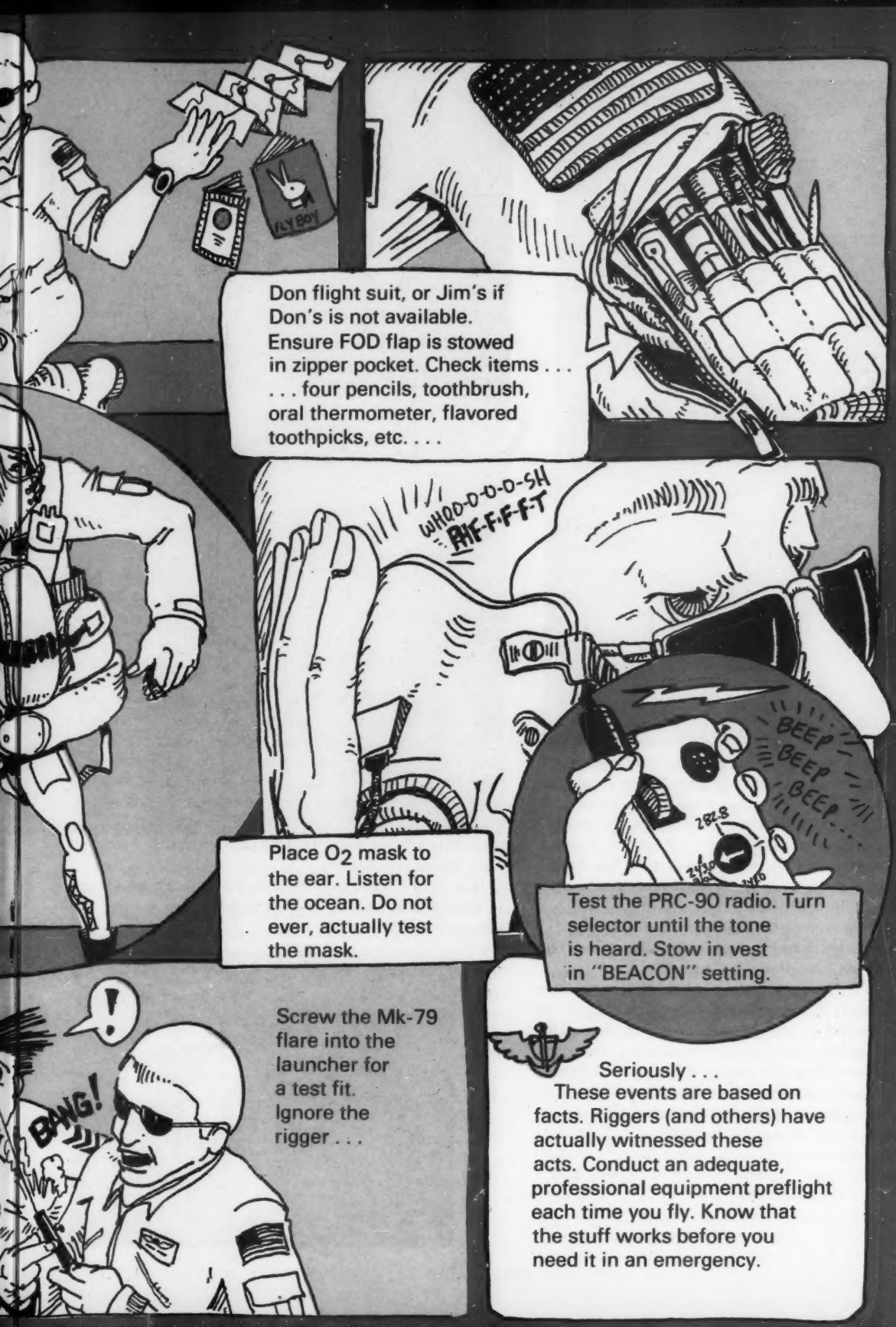
Check boots for excess polish, dog tags in place (either on boot or on the dog). Look for exposed nails. Lace them up. Attempt to walk. Retie.

Request XL oxygen mask, ML torso harness, size 3 G-suit and super XL survival vest. Check SV-2 for your 15 pounds optional gear; candy bars, Rambo knives . . .



Obtain foam ear plugs. Swallow one, save one for later.

Ensure that vest leg straps are firmly connected through the beaded handles.



*Inspirational thanks to Lt. Jon Etheredge

Your NOMEX Flight Suit

By Joseph K. Taussig, Jr.

When it was developed, Nomex was the most fire-resistant fiber from which affordable, wearable fabrics could be woven.

Fires typically reach 1,500 to 1,850 degrees Fahrenheit. When you approach these fires, several vectors become involved: *radiation, convection* and *conduction*. The formulas are very complex. Fires are rarely exact duplicates because of the variety of the environments in which they occur.

The convection vector is generally associated with a rise in temperature as a function of increasing air (oxygen) flow. The larger the fire, the more dramatic the effect.

Conduction is a major element of clothing concern since the applied heat from the radiation/convection phenomena impinges on the fibers. They, in turn, conduct heat towards the body. Most fibers are quite similar in insulating properties. Each has its own index of conductivity, hence, a "figure of merit" which is dependent on the heat applied. Because all clothing involves "air" between outer fibers and the skin, air is usually more important to the individual than the conductivity of the fibers themselves. However, the more fibers in the thickness of fabrics, tightness of weave or layers of fabrics and air we have, the greater the safety.

Radiation is the vector that applies the most heat. We aluminize some fabrics to reflect heat, but most fabrics are not aluminized. Therein lies a lesson.

Compared to dacron and other fibers that melt, shrink or char at around 300 degrees Fahrenheit, the 700 degree Fahrenheit resistance of Nomex is obviously better. However, when facing a 1,500 degree Fahrenheit threat, dacron and Nomex will both ignite.

Today, two chemical treatments — FRT Cotton and ARNOX — can elevate the tolerance of fabrics against ignition. Three permanently fire-retardant fibers — PRE-OX, PBI and Kynol — can withstand 1,500 degree Fahrenheit and more without melting, igniting or becoming a useless char.

Were we to issue a "report card" on fire resistivity and assign the five 1,500-degree-Fahrenheit-plus technologies an "A" and dacron a "D," we'd find Nomex at around a "C." If we went to a "go or no go" fire tolerance criteria, *we would fail both dacron and Nomex*.

With FRT Cotton and ARNOX, there are "chemical fugitive" problems, such as chlorine laundry products that can destroy the fire resistivity.

When it comes to physical properties, a very complex set of considerations come into play. In the report card analogy, Nomex gets very high marks for abrasion resistance and strength. Cotton gets very low marks. Yet cotton is one of the oldest and most-worn fabrics, and we have adopted FRT Cotton for shipboard work clothes. Hence, FRT Cotton passes a "go or no go" criteria for shipboard use, regardless of whether it gets a "D" or "C" on a report card that gives Nomex an "A."

Further, the weight and weave of a fabric can affect strength, abrasion resistance and wearability.

We can also blend fibers. For example, our EEBD hoods are a blend of 70 percent Kynol and 30 percent Nomex fibers.

In civilian life, we meet these "property challenges" rather simply. Because of lifelong exposures to various fabrics, we handle before we buy. We don't send them to a laboratory for strength, tear, wear, abrasion or other tests. We don't even insist on a "T&E" program. Save for some controversies vis-a-vis aesthetics, we seldom make errors from our judgments reached by simply handling a fabric.

Fire tolerance is the most compelling criteria, but there are other capabilities. Some fabrics can be sanforized. Some can be treated for permanent press qualities. Some can be made water repellent. Most can be aluminized or rubberized. Most can be napped, or even produced as "furs."

Because 240,000,000 Americans use fabrics, the Navy's share of the market is generally very small. But choices of weights, weaves, blends and patterns are very large. Many companies operate small quantity looms. By making straightforward choices of numbers of bobbins and settings on the loom, they can manufacture yard goods very rapidly. Similarly, numerous companies convert fibers into various yarns by long-known spinning techniques.

A major Navy problem is lack of expertise in specifying the infinite numbers of combinations and permutations available. An experienced "fibers and fabrics" engineer, who knows the capabilities of the various machines used to convert fibers into the numerous end product forms we see in any department store, is hard to find on the Navy payroll . . . but we're working on it. What lies in the future? You can be certain that the fabrics presently used in naval aviation will change, but beyond that . . . maybe a red fur Sierra Hotel flight suit for these fly-ins from cruise? Who knows? ◄

Mr. Taussig is Deputy Under Secretary of the Navy (Safety and Survivability), Washington, D.C.

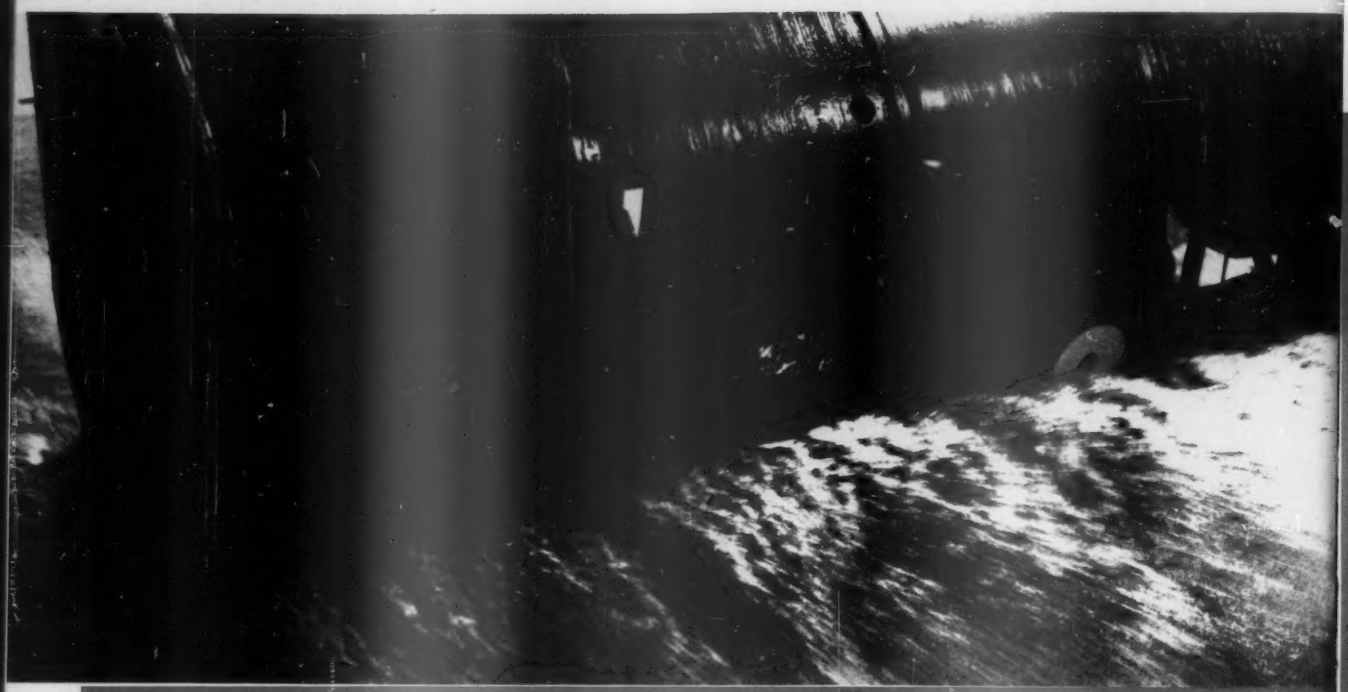
The Helo Dunker. I Think I Love It!

By Lt. W.B. Pearce

I REMEMBER my first time. I was a lieutenant (jg) retread from the surface force, breezing my way through aviation indoctrination at NAS Pensacola. On this particular day I was already cold and wet from a date with Dilbert — not a bad "blind date," all things considered. Now I was about to be introduced to the Dunker.

Compared to Dilbert, my coming assignment was lacking in both looks *and* personality. It looked like an oil barrel on steroids and was about as inviting as a request to appear in the wing commander's office.

Our introduction to this unnatural contrivance was a demonstration of its

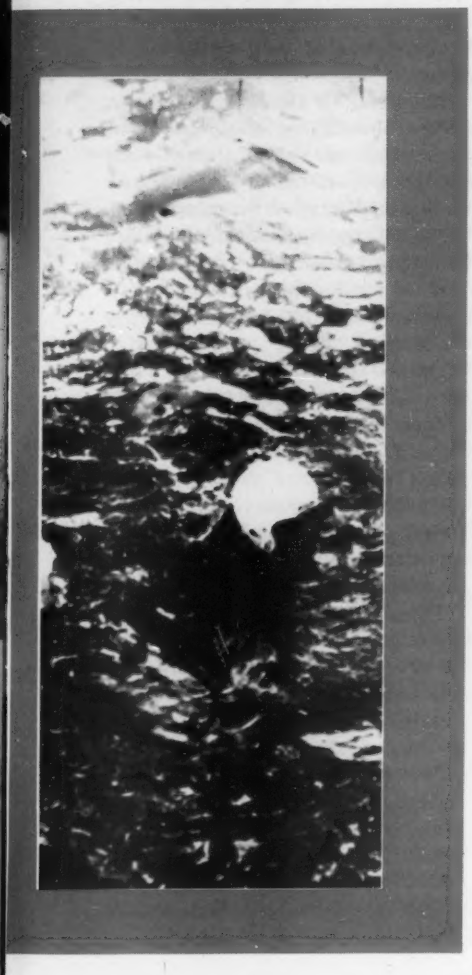


. . . There is no doubt in my mind that the training I had received in the helo dunker and had rehearsed over and over again in my mind helped me stay calm and react properly. . .

operation, designed to instill confidence in the suckers — oops, students — in the safety of this wonderful machine.

As shivering students looked on, the overgrown oil barrel dropped about 6 feet from its position above the pool, hit the water with a dull, hollow "sploosh," and rolled rapidly into an inverted position as it settled beneath the surface of the pool. Bubbles rose from the can as it rolled over, coming out at first like the last great exhalation of a dying whale, then tapering off to a steady stream of smaller bubbles. Somehow, the instructor's smiling assurance ("See, that's not so bad"), brought little comfort to us.

Our trepidation was short-lived, however, as we encountered our first "dunk." The experience was not at all bad. A few adventurous people thought it was fun.



We just got wet all over again (and, if the truth be known, being *in* the pool was a lot warmer than standing by the side of it, shivering). Comments in the vein of "Hey, a definite 'E' ticket at Disneyland" were heard. So much for trepidation.

What replaced it, though, was a vague sense of unease. The instructor announced that we would now "try it with the blackout goggles."

What's that you're saying, Mr. Instructor? Blackout goggles? Surely you jest, sir! Unease transitioned to terror as the reality sunk in. The rules had changed, and it was no longer a game. *This* was serious stuff. Big, strong ex-football players began to visibly blanch and shake their heads, as if to say that wild horses weren't going to be enough to get them to do this crazy thing. Murmurs of discontent and rebellion were heard, along with one or two whimpers of pure fear. A few brave souls, grim-faced and perhaps more confident in their eternal destinies than the others, volunteered to be the first guinea pigs to play out this macabre scenario. One such fool was me.

The shock of cold water rushing in was much more noticeable this time, the disorientation definitely more pronounced. *Which way are we rolling? How high is the water? Oops, it's on my cheek! Turn the head, take a last breath, count to three. All right, pull the 'emergency release handle,' get a handhold, release the harness. Oof! Who just kicked me in the gut? That idiot! I'm supposed to go out first! Which way now? Chest is getting tight — better let a little air out. There's the door! Pull! Great! Which way's up? Wish I had an LPA. Can't even see any bubbles. Is this really how it's going to be? Come on surface! Let my hands feel the air! There it is! Kick! Kick! AIR!!*

"Not bad for a trial run — you'll do fine on the graded run."

TRIAL RUN?!?! ARE YOU CRAZY? DO YOU ACTUALLY BELIEVE I'M GOING THROUGH THAT AGAIN? Yep — and you do. You may not love it (and you certainly don't like it), but you do it. Whew! Glad *that's* over with! Five more years 'til I have to do this craziness again! Maybe so. But. . .

I don't know who Mr. Murphy was, but he sure had a handle on how things work in life. There I was in my aging SH-3H, strapped in tighter than the stuffing in a Thanksgiving turkey, not believing what I was seeing. It was a rainy night in the South China Sea, with no moon, no stars, just a lot of blackness. And there I sat, watching H_2O pouring in through the starboard chin bubble just beside my feet. What happened? How did we get in the water? "We're on the surface. Everybody get ready to get out."

The water rose quickly up my legs and torso. I could see the surface as it approached my head, and I got the definite impression that the helo was rolling to starboard — right in my direction. *Here it comes — water's on the cheek, take a breath, count to three, get a handhold, release the harness. No, wait — the emergency release handle, gotta find the emergency release handle. Should be right about — there it is! Pull, pull! Push out the window —free and easy. Thanks, God, for not letting the window jam. Grasp the sides of the frame and — PULL! Come on, kick those flight boots. Gotta get some air! Can't see a thing — come on, LPA, do your thing! Ahh! Fresh, beautiful, clean air!*

As I and the rest of the crew bobbed around, waiting to be picked up, guess what thought kept going through my mind? Just like the helo dunker —thank you, thank you, helo dunker! While I also give credit to higher powers for keeping me alive that night, there is *no doubt in my mind that the training I had received in the helo dunker and had rehearsed over and over again in my mind helped me stay calm and react properly.*

The helo dunker a training device? Hah! It's a life saving device! My only regret is that it wasn't required once per work-up cycle rather than once per sea tour — and maybe it should be. When's the last time you, who ride in helos, trained to save *your* lives?

The helo dunker — I think I love it.

Lt. Pearce is an SH-3H pilot with HS-6, NAS North Island, Calif.

. . . The location of heavy components, such as the engine and the transmission on top of the fuselage, causes a very high center of gravity for the helicopter. This configuration, combined with the dynamics of the landing and possible high sea states, can cause helicopters to invert and sink quickly . . .

H-46 Emergency Flotation System

By William A. Mawhinney

HELICOPTER emergency landings or crashes on water have caused numerous drownings of crewmen and passengers. Usually the helo sinks rapidly.

The location of heavy components, such as the engine and transmission on top of the fuselage, cause a very high center of gravity for the helicopter. This configuration, combined with the dynamics of the landing and possibly high sea states, can cause helicopters to invert and sink quickly.

In-rushing water, disorientation, poor visibility, panic and equipment constraints have hampered egress and prevented crewmen from getting out. To remedy these problems the Navy installed an emergency flotation system on the H-46 helicopter because its primary mission is to carry troops during amphibious assault operations, and it has a history of sinking rapidly during emergency water landings.

The Naval Air Development Center, under sponsorship of Naval Air Systems Command, was the lead activity for development of the H-46 Helicopter Emergency Flotation System (HEFS). Technical support came from the Naval Ordnance Station and the Naval Air Test Center. Boeing Vertol Company, manufacturer of the H-46, was the prime contractor.

The primary objective of HEFS is to keep the H-46 afloat and upright for 10 minutes with the escape hatches above the surface of the water. This would permit crewmen and passengers to get out safely. A secondary objective is to keep the aircraft afloat in any attitude for three hours to permit aircraft recovery.

The main components of HEFS are two inflatable floats, one on each side of the aircraft; four pyrotechnically actuated inflators; two semirigid fiberglass pods in which the system is stowed close to the fuselage contour; two water-activated switches; an electrical system and mounting hardware. HEFS weighs 275 pounds.

The float is made of polyurethane-coated Kevlar. The inflated float is cylindrical with nearly hemispherical

end caps and is divided by a central, circular diaphragm into two independent cells so that localized damage will not cause complete float deflation. It is 112 inches long and 57 inches in diameter and has a total volume of 140 cubic feet. A fully submerged float would provide a buoyant force of almost 9,000 pounds. Four water ballast scoops are provided along the outboard surface of the float to improve aircraft roll stability.

The inflator consists of an electric initiator, a breach containing ignition pellets and solid propellant, a pressure vessel filled with carbon dioxide, a manifold connecting the pressure vessel to the breach, burst discs and an outlet port to the float cell. An inflator is connected to one float cell so there are two inflators per float.

If an ordinary pressure vessel were used to inflate the float, the initial pressure in the float would be higher at higher temperatures. The HEFS inflator automatically compensates for temperature variations throughout the operational temperature range of the H-46. The sizing of the burst discs and the configuration of the propellant and the outlet port cause the propellant to be extinguished when sufficient gas has been generated to create an initial float pressure of approximately 2.25 psig.

HEFS can be operated in either the automatic or the manual mode. Before an overwater mission, the flight crew will arm the system by means of a guarded "arm" switch located in the cockpit. When either of the two water-activated switches on the bottom of the fuselage are activated by water immersion, an electric signal is sent to fire the inflators and deploy and inflate the float. If the automatic mode fails or if the aircraft has been intentionally landed on the water without arming the system for a SAR mission and the aircrew then decides to inflate the floats, they can manually activate the system by means of a guarded emergency float switch in the cockpit.

Design verification tests and service release tests of the HEFS inflator were conducted by the Naval Ordnance Station to qualify the inflator for fleet use.

During the full-scale development test program, the Naval Air Development Center conducted flotation attitude tests at NAS Key West with HEFS installed on a refurbished H-46 aircraft hulk. After three hours the flotation attitude of a maximum-gross-weight H-46 with the fuselage completely flooded is shown in the photo. An unflooded aircraft floated much higher in the water and almost horizontally.

A series of 13 full-system HEFS tests was also conducted on the refurbished H-46 hulk to demonstrate system operation and reliability. The automatic mode of operation was tested by lowering the aircraft into the water with a crane to operate the water-sensing switch and activate the system. The emergency mode of operation was tested by placing the aircraft in the water with the system unarmed and then operating the emergency float switch while the aircraft was floating. On the final test the aircraft was dropped into the water from a utility landing craft from a height of approximately 1 foot with a 12-knot forward velocity. All four inflators functioned properly, and both floats deployed properly on all 13 tests.

Flight tests and water handling tests were conducted at the Naval Air Test Center. Twenty-one flights for a total of 24.3 flight hours were completed. In the stowed configuration HEFS had no noticeable effect on aircraft performance. Even with HEFS in the deployed configuration, aircraft performance was completely acceptable at 108 knots.

The H-46 HEFS has completed technical evaluation and operational evaluation and has been approved for full production. The technology developed for the program would be applicable to the development of a flotation system for other aircraft.

HEFS will be introduced into the fleet in retrofit kits as part of an aircraft block update. A 61-pound aircraft provisions kit will be installed permanently on all of the H-46 aircraft at the Naval Aviation Depots at Cherry Point and North Island. This kit includes the electrical system, water-activated switches and mounting hardware. Two 107-pound mission kits per aircraft will be installed on approximately half of the CH-46E model aircraft and on all of the CH/HH/UH-46A/D model aircraft, which are used for vertical replenishment and search and rescue. A mission kit includes one float, one pod and two inflators. Mission kit installation is quick and easy and requires almost no training or special equipment. ◄

Mr. Mawhinney is with the Naval Air Development Center, Warminster, Pa.

Take Heed and

By Bud Baer

THE HH-46A Sea Knight lifted off USS *Camden* (AOE-2) at 1015 for a functional test of its newly installed aft transmission. The ship was operating in the Northern Arabian Sea of the Indian Ocean.

On board were Lt. Steven Rosandich (pilot), Lt. Gregory LaFave (copilot), ADl Timothy Chayka (crew chief) and AO3 Francis Garcia (second crewman).

A half hour into the flight, they began the autorotation phase of the test. At 1,500 feet they began descending at 65 knots. At 500 feet Lt. Rosandich pulled collective; suddenly, the helo lost all power.

In less than five seconds, the helo dropped into the sea. It struck the water hard and immediately began to sink. The force ripped the cockpit from the rest of the helo. Lt. Rosandich was smashed against the door and broke his jaw. Lt. LaFave was pinned under the battered instrument panel.

32 ADl Chayka was flattened on the deck by the force of the impact. AO3 Garcia was seated when the helo hit the water and driven to the hard deck.

All four crewmen were stunned and disoriented as they struggled to save themselves. ADl Chayka got out, but AO3 Garcia had a more difficult time making his way to safety (he describes his experiences in the accompanying article, "Here's What Happened").

Lt. Rosandich and Lt. LaFave also escaped the sinking helo; Lt. LaFave's firsthand account of his experience, "More Than Luck," accompanies this article.

Both Lt. LaFave and AO3 Garcia credit their survival to the new aviation life support system, HEED: the helicopter emergency egress device, a small device that provides breathing air in emergencies. HEED was in service only a short time before this mishap; it was the first time that it saved lives. Since then, there have been other helo ditchings where HEED played a similar lifesaving role, and there will be undoubtingly more in the future.

Another HH-46A suddenly lost power in an engine while performing VERTREP at sea. With the engine winding down, the pilot ordered release of the cargo. The pilot made a controlled landing on the water, but the helo soon rolled over on its right side and sank. Three of the four persons on board made safe exits. One crewman, however, became entangled in his ICS and gunner's belt. Using his HEED bottle, he was able to untangle himself and move out of the helicopter to the surface.

A UH-lN turning on final toward the ship ran into trouble. Crew members heard a loud noise in the transmission and felt

Survive

vibrations in the airframe. They were at only 125 feet, not much height to find time to correct the problem. The tail rotor slowed down to almost a stop as the pilot said, "We're going in."

The UH-1N yawed approximately 90 degrees and splashed into the water. It rolled to the right and immediately began to sink. The copilot had donned his HEED a few seconds before impact and had pulled the door jettison handle. As the helo went under, he kicked off his door and tried to release his harness. It wouldn't budge. With his HEED on and operating, he had extra time to work himself from the harness and escape from the submerged helicopter.

HEED is a small, high-pressure, 1,800-psi aluminum cylinder with a demand regulator. The regulator is permanently attached to the cylinder, which is 10 inches long. HEED weighs less than two pounds and is carried in a modified holster of the SV-2 vest. Studies are underway to develop a holster for HEED for an alternate stowage position. HEED will supply at least two minutes of air at a depth of 20 feet with

Here's What Happened

By AO3 Francis "Skip" Garcia

I was acting second crewman that day during our functional check flight. Just before the pilot announced we were ready for the autorotation phase, I could see whitecaps on the sea below and the battle group off in the distance. The last thing I did before the auto was to tie down the tool box in the aft section. The pilot announced we were going to do the auto, and the crew chief replied we were all set aft.

We seemed to drop very fast and I held on tightly as I looked out of my observation window. I became anxious as the drop continued. Then someone said, "Hold on! We're going in."

We continued to drop, and there was nothing I could do about it. I didn't have time to buckle my seat belt, but I kept my gunner's belt on. I heard the helo try to slow up. I held onto my seat tightly.

When we hit the water, I felt certain that I was going to die. We hit hard, and I felt a sharp pain in my lower back. I was thrown to the cabin floor. I wasn't sure at first if I could move my legs. At that point I had tunnel vision. I couldn't see anyone or anything around me.

All I could think of was my wife, Terri. We had only been married a year, and the thought of her being alone frightened me. These thoughts of her and my family in Colorado made me try harder to get myself out.

In only seconds I was chest deep in water. I tried a couple of times to release myself from my gunner's belt, but I was still dazed and confused. I took one last deep breath before I was under water.

I didn't know if I could make it out. Then I remembered my HEED bottle. I grabbed it from the left pouch pocket of my SV-2 survival vest. I made sure it was on and put the mouthpiece in my mouth.

I could breath normally now. What a relief! I was able to calm myself and think. All I needed was that couple of extra breaths of air to think things out. All at once my survival and aircrew training came into play. I easily released myself from my gunner's belt and saw an opening. As I pulled myself through the main cabin door, I could feel the helo swing and roll to the right.

Once outside, I activated my flotation lobes and floated about 10-to-15 feet to the surface. I saw daylight and the rest of the crew. It was the biggest relief of my life. We all took care of each other, using our survival skills until we were picked up.

AO3 Garcia is an aircrewman on H-46s, flying with HC-11 based at NAS North Island, Calif.

water temperature at 55 degrees. It costs $227. Components of the regulator include an on-off valve, a combination filler valve and pressure gauge, a purge valve, a mouthpiece and an exhaust valve.

HEED is filled with compressed air that is filtered and purified for breathing underwater. It should never be filled using high-pressure air compressors, which are common on flight decks and in hangars, but only filled from compressors specifically assigned as HEED support equipment. The cylinder should be filled only by qualified personnel using approved procedures.

The need for HEED became increasingly evident when Navy safety officials took a close look at helicopter mishaps that resulted in water entry. They noted that during 1981 through 1983, there were 37 Navy and Marine Corps helo mishaps over the water. In 29 of them, the fuselage either inverted or sank immediately after impact, requiring the aircrews to free themselves from the wreckage and swim for their lives. Twenty-seven people didn't make it.

MSgt. John E. Cleary, among many others, was instrumental in developing HEED. Now with the Crew Systems Division, Naval Air Systems Command, Washington, D.C., MSgt. Cleary last year received the Navy Commendation Medal from his previous command for his work with HEED and his overall performance.

In January 1983, Col. Ward Johnson, USMC, commanding officer of Marine Air Group 46, based at MCAS El Toro, Calif., was alarmed by the drownings from helicopter overwater mishaps. He felt there was a desperate need for an emergency underwater breathing system that could save lives.

Col. Johnson called on then GySgt. Cleary, his unit's senior flight equipment specialist and parachute rigger, to come up with a portable breathing system that would be lightweight, cost-effective and provide a few minutes of air. MSgt. Cleary spent months exploring all possibilities, particularly those that offered an off-the-shelf solution. The goal was to minimize the often lengthy procurement and development time in order to get a system fielded as soon as possible.

"I went to work on the project, first going through all the scuba magazines," MSgt. Cleary said. I borrowed one of the bigger commercial units that looked like it might fill our need, with modifications. I took the regulator off the top and attached it to a small, one-man, life-raft bottle." This evolved with slight modification into the HEED bottle we have today.

By the spring of 1983, with the help of Lt. Tim Goodwin, HEED program manager of NAVAIR, and George Gillespie of the Naval Air Development Center, Warminster, Pa., two types of breathing systems were developed, one of which eventually made HEED a reality. With NADC's Crash Safety and Survival Systems Branch, Mr. Gillespie was HEED's project engineer in charge of all technical issues. Joe Taussig, Assistant Deputy Under Secretary of the Navy for Safety and Survivability, exerted his influence to speed the introduction of HEED.

Navy helicopter aircrews learn the right way to employ HEED through use of a shallow water egress trainer (SWET), pictured above and below, right. No crewman is issued HEED until he has learned the correct breathing techniques from this training. On the right is a closeup of the HEED bottle that will provide at least two minutes extra breathing time.

Today about 90 percent of the helicopter aircrew population, more than 7,000 people, have "earned" their HEEDs after completing a short training course. Instruction is given at naval survival training sites at Cherry Point, N.C.; El Toro, Calif.; Jacksonville, Fla.: Miramar, Calif.; Norfolk, Va.; and Pensacola, Fla.

"Our training program for HEED is extremely important," said Lt. Barbara Boyd, training officer at the water survival school, NAS Norfolk. "There's no question that those who attend are better prepared to survive a ditching."

Underwater breathing procedures are accomplished with a shallow water egress trainer (SWET), which is used to teach helicopter aircrews the right way to use HEED. A trainee is strapped onto SWET and rotated to a face-down position in tests that never go below a depth of 3½ feet.

A thorough understanding of how to breathe compressed air underwater is essential, as well as this special training to develop instinctive breathing techniques, training officials emphasized. If you don't use HEED properly, you can develop a potentially fatal air embolism (caused by air bubbles reaching the blood stream).

In its first year in the Navy's aircraft life support system program, HEED has saved lives. Instances of "death by salt-water drowning" are expected to be substantially less in the future because of HEED. ◄

Lt. LaFave and AO3 Garcia are two individuals who have had a chance to thank MSgt. Cleary personally for his efforts. Their det received their bottles only a few days prior to deployment.

Bud Baer is a staff writer for Approach magazine.

More Than Luck

By Lt. Gregory J. LaFave

It was a typical hot, humid day in the Indian Ocean. I awoke about at 0500, feeling a bit groggy from having flown until 0100 that morning. Fortunately, I was able to grab breakfast and catch a few more hours sleep before my next flight. At 1015 we departed USS *Camden* (AOE-2) in Sideflare 71 (an HH-46A) for a functional check flight on an aft transmission that had just been replaced.

The flight progressed smoothly with no discrepancies until the final check, which was a maintenance autorotation. At 500 feet AGL, 65-70 knots and rate of descent more than 2,000 fpm, we tried to recover. A full power loss was immediately apparent — water impact was imminent.

The pilot at the controls, Lt. Steve Rosandich, continued with the autorotation. I locked my harness and braced for the impact. Within seconds the Sea Knight hit the water; both the chin bubbles and windshield imploded. It sank immediately, apparently breaking into several pieces.

At the very next instant, I was completely submerged, trapped inside the sinking helo. Struggling, I thought, "I'm going to die."

I was disoriented and apprehensive, but still able to recall the egress procedures I had been taught. I needed air! Aware that my legs were pinned under the cockpit instrument panel, I grabbed my HEED and quickly guided the canister mouthpiece to my lips. I didn't invert the bottle or purge the regulator; I gasped for air and found that it was immediately available.

Suddenly an immense calming effect prevailed, and I could think and react without panic. Using the cockpit instrument panel as a reference, I released my harness. Then I pushed the panel away with both arms while also working my legs free. I exited forward over the panel and swam through the hole where the window had been.

I pushed myself away from the helo and floated upward, breathing continuously on the HEED bottle. After ascending some 15 to 20 feet, I broke the surface. I was greatly relieved to see the three other crew members. I inflated my flotation lobes. The four of us swam together, discussed our injuries and began to think about rescue procedures. Our PRC-90 radios failed to operate, so we relied mainly on flares, smokes, sea dye markers and mirrors. After about 45 minutes, an H-46 from a sister detachment spotted us and came in for the pickup.

The four of us are fortunate to be alive, but our survival was not strictly due to luck. To a much greater extent it was a result of training that gave us confidence in using our survival gear. That is the primary reason the four of us are alive and still flying today.

Lt. LaFave flies H-46s with HC-11 at NAS North Island, Calif.

HEED Helps Aircrewman Escape

HEED recently came to the rescue again when an SH-2F inadvertently hit the water during an IFR approach to a ship. The cabin remained intact but was filled with water within 15 seconds. The helo rolled to the right until inverted, floated for five minutes and then sank. The pilot in command and the copilot got out, but the aircrewman had some difficulty. He used HEED as he made his way out of the inverted helicopter. He unsuccessfully tried to punch out his window, then released his harness and swam from one point of hand-held reference to the next, until he exited through the cargo frame. HEED gave him extra time to find his way out.

Anatomy of an Ejection

By LCdr. Stephen E. Clinko

AFTER my recent ejection from an EA-6B, many other flyers were naturally curious to hear the details. I would recount my story to whoever was in the room, giving as much detail as possible. No sooner would I finish than more people would enter the room wanting to hear it again from the top. I felt like putting the story on tape and just pressing "play" when the next person asked. Maybe some fellow rocket-seat riders can learn a few things from my experience.

The flight was just another FRS training flight (at least for the first five minutes). While passing 17,000 feet, 20 miles southwest of Whidbey, a loud double explosion rocked the double ugly. From the aft right seat I couldn't see the two fire lights that lit off immediately after the explosion, but I knew this wasn't just the usual bump in the night. I made sure my mask was cinched up tight and then started to tighten the waist straps. Suddenly the aircraft stopped climbing and pitched down. I could feel slight negative G. I wondered if the pilot had done this or if the aircraft was out of control.

The front seat ECMO attempted an emergency call, and the pilot called off the two fire lights. I assumed the ejection position just in case, then looked up at the flight instruments. We were nose down, descending, with about 90 degrees of right wing down. This convinced me that we were out of control, since the pilot wouldn't put the aircraft this way voluntarily. Also, while looking at the instruments, I noticed a considerable

amount of gray smoke coming from behind ECMO three's seat.

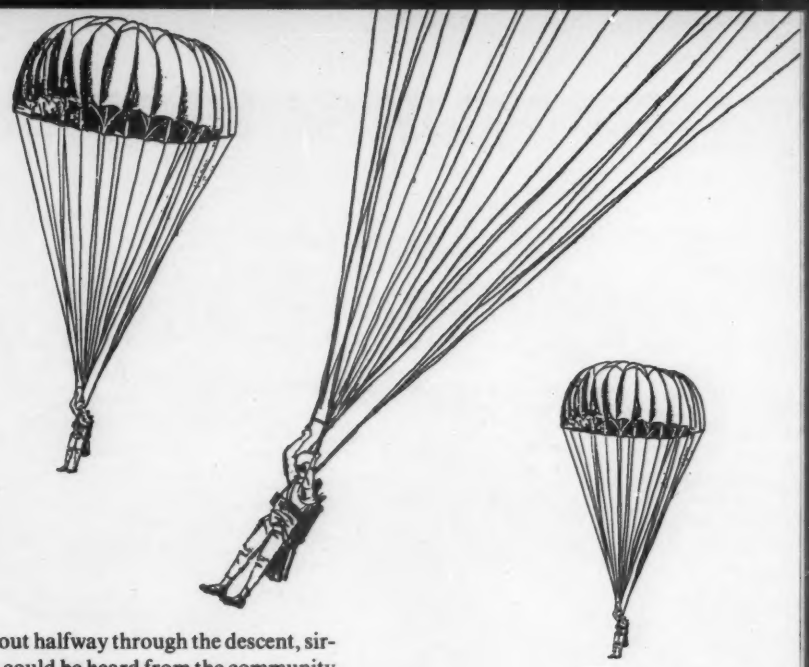
An explosion, two fire lights, smoke in the cockpit, and an aircraft out of control and passing 15,000 feet meets my ejection criteria. I stuck my chin up and yanked the upper handle tightly into the chest. Explosion to ejection: about 10 or 12 seconds.

The .4 second time delay felt like zero. The wind blast was heavy (400-450 knots), but I was determined to keep my arms tight to my chest to prevent flailing. I succeeded but let go of the handle with the opening shock. My only other thought was whether or not the chute would open (of course, it did). The next order of business was to inflate the LPA. After all, that's what was called for by IROK.

After inflation, I looked up to see a completely inflated chute, then looked down to see what kind of terrain was beneath me. The good news was that I was over land. The bad news was that the westerly wind was blowing me over the water. I popped the four-line release and turned into the wind to try and avoid the water, but the wind was too strong and I continued eastbound. It was time to get the raft out. I realized that my flight gloves were off at the time of ejection. With a 400-knot windchill factor in December at 15,000 feet, my hands were frozen stiff.

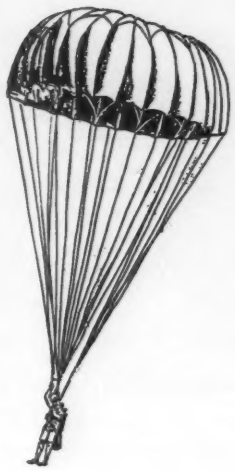
Since I couldn't see the small yellow SKU-2 release handle, I had to do it by touch. It was impossible with frozen hands. I was committed to landing without a raft. I tried to thaw my fingers by sticking them in my mouth and kept feeling for the handle. No joy. My flight gloves were in the left thigh pocket with the zipper closed. However, my survival vest contained leather gloves with wool inserts inside a MAF bag. I got these out and cracked the bag open (the bag was frozen solid). They would only go on about halfway because my fingers couldn't 'feel' their way into the gloves. My fingers would remain almost unusable all the way down.

Off in the distance I could see the other three Martin Baker veterans floating down and was wondering if they were having as much fun as I was.



About halfway through the descent, sirens could be heard from the community below as rescue vehicles tried to anticipate where we would land. Fortunately, the wind shifted 180 degrees down low and pushed me back over land. Now I had to worry about what I might land on and how to land. If I turned into the wind, the landing would be proper, but I wouldn't be able to see what I'm about to land on (moving backwards). If I went with the wind, I'd see what's coming but land on my face. I compromised: I went with the wind until the last moment, then pulled a 180 with the 4-line release and landed rolling backwards. Other than a bump on the head, the landing was textbook.

Five minutes after my landing, a car showed up and took me to a nearby airstrip to rendezvous with the other three crew members. Not until we were ready to board the Navy helo did I discover that my helmet was missing. Surely I must have left it at the landing site. In fact, a month later it was found in the woods with the mask fully attached by both bayonet fittings! Somehow it had come off during the ejection and opening shock without my realizing it. How could I not know my helmet was off? Although I *felt* perfectly normal while standing around waiting for the helo, there was obviously some shock affect in this traumatic event. A lot of basic things happened for which I had no recall. Obvious things went unnoticed.



The next time I go out I'll have my gloves on, particularly at high altitude. My helmet will also be strapped on tightly with the chin strap snug. I had time to tighten up the waist Kochs and assume the proper position. Next time that luxury may not be available. *Nobody* ever intends to eject, but plenty of people do every year. Are you prepared for what you'll encounter? ◄

LCdr. Clinko is the safety officer of VAQ-137.

The

In this 1965 photo, Ltjg. Irwin waits for the *Hancock's* helicopter. His F-8 sank minutes later.

In the precious few seconds remaining, Ltjg. Irwin considered an out-of-the-envelope ejection, but decided to stay with the airplane.

Today's ejection seats offer a measure of safety and reliability light-years beyond that available 20 years ago. Most systems have a zero-zero capability and a wide envelope of performance. However, there may come a time when you have to decide to either use the seat or remain with the aircraft. It may be a decision only you can make at the time, unguided by fine-tuned NATOPS procedures and ready-room sea stories. Consider a young fighter pilot's experience in the South China Sea in 1965.

In January of that year, the war in Vietnam had only begun to gather momentum. After the Gulf of Tonkin Incident in August 1964, the U.S. increased its carrier presence off the Vietnam coast in anticipation of stepped-up bombing activity. One of these ships was the USS *Hancock* (CVA-19), with its air wing, CVW-21, which included VF-24, flying F-8C Crusaders.

Right Decision

By Peter Mersky

Before arriving on Yankee Station, (a geographical point established as a staging area) the *Hancock* went through several days of work-up training. VF-24's responsibilities included strike escort and fleet defense. These early model Crusaders were the last single-seat, gun-armed fighters.

On January 13, 1965, Ltjg. Tom Irwin was returning from a day air intercept training mission. Trapping aboard *Hanock*, his Crusader caught the carrier's No. 4 wire. The rollout seemed normal. He was about to retard the throttle when he suddenly realized the deceleration had stopped and he was still moving. The F-8 was headed for the edge! What he did not know was his hook point had parted from the tailhook shank at approximately 80 percent of the cable pull-out.

He immediately jammed the throttle into afterburner, but there was a two-second delay for the burner light. The Crusader floated over the angle with its KIAS well below the 80 knots required for a successful ejection; the early F-8s did not have a zero-zero seat. He pulled the canopy jettison handle but although the latches released, there was not enough airspeed to carry the canopy away and it stayed on the rails.

In the precious few seconds remaining, Ltjg. Irwin considered an out-of-the-envelope ejection, but decided to stay with the airplane. Fortunately, the airspeed he did have gave him limited pitch control. By keeping his wings level, he was able to enter the water more or less level, rather than nose first or in a cartwheel.

Just as the aircraft hit the water, the afterburner ignited, causing the engine to explode. The water impact also carried off the canopy. Although the Crusader entered the water upright, water immediately began pouring over the cockpit sill. Pulling the ditching handle, he released himself from the seat. He bobbed out of the cockpit just as a wave splashed over him. The oxygen hose from the seat pan to his mask was tangled on the canopy handle on the right canopy rail. While awash and laying on the rail, Ltjg. Irwin managed to separate the connector at the end of the mask hose and quickly rolled over the side of his fighter. The forward end of the center section of the F-8's two-position wing and most of the vertical stabilizer were all that were visible above the water. Now in the water, he inflated his Mk-3C preserver as he watched his F-8 sink out of sight. By now, the *Hancock* had stopped close by and the SAR helo arrived from its station on the starboard quarter. The H-2 pilot had to be careful since the strong surface winds and close proximity of the carrier dictated a slow approach.

Thirteen years after ditching his Crusader, Cdr. Irwin sits in the cockpit of his RF-8G while CO of VFP-306. This aircraft has a zero-zero seat, but the F-8C he flew in Vietnam did not.

Although his ejection seat's capabilities did not give him many options, Ltjg. Irwin considered his choices and quickly decided — correctly — to remain with his plane. If he had had a zero-zero seat, he would have used it. As it was, he became one of a few sweptwing jet aviators to successfully ditch an aircraft. His experience indicates the value of thoroughly knowing your aircraft's escape system and its envelope.

Postscript—

After his rescue, Ltjg. Irwin served his tour in VF-24 through the early operations in Vietnam, and participated in the Flaming Dart strikes of February 1965, which previewed the large alpha strikes later in the war. He is now a captain in the Naval Air Reserve and has nearly 3,000 hours in several models of the F-8.

HEELS

By Thomas J. Wardle

WHEN a helicopter ditches, it will frequently overturn due to its high center of gravity, fill with water and rapidly sink. It may be dark; the aircrew may be confused, injured or in shock; there may be floating debris and an inrush of water; there may be visual references. All of these factors impede rapid escape, but investigations reveal that the *lack of a visual reference* is the main hindrance.

The Helicopter Emergency Egress Lighting System (HEELS) gives a visual reference in the form of light strips that automatically outline and illuminate

. . . HEELS gives a visual reference in the form of light strips that automatically outline and illuminate escape hatches when an emergency landing condition may be imminent.

escape hatches when an emergency landing condition may be imminent. HEELS is a part of the Navy's Helicopter Aircrew Survival Enhancement Program (HASEP).

HEELS consists of two assemblies: the light tube and the control unit. The light tube is translucent, extruded silicone rubber and is fitted with numerous yellow-green light-emitting diodes (LEDs). The LED light is compatible with night vision goggles and is highly visible under adverse optical conditions at a distance of up to 14 feet and at angles up to 65 degrees from dead ahead. The silicone rubber material is impact resistant, yet flexible enough to conform to airframe contours. It is not affected by aircraft fuel, hydraulic fluid or transmission gearbox oil. The light tube is mounted around the exit in an inverted "U" shape, which defines the escape hatch aperture.

The control unit has a cast aluminum housing, a rechargeable nickel-cadmium battery pack and an electronics module. The latter arms and dearms the system, tricklecharges the battery pack, actuates the system and tests the battery. A switch inside the control unit allows each hatch to be disabled in the event it cannot be used as an exit; for instance, if the exit is blocked by cargo. Mounted on the control unit is a press-to-test switch. When this switch is depressed, an LED indicator will light, indicating that the switch is in the "function" position and that the battery pack has sufficient charge to illuminate the light tube. While aircraft engines are in operation, a trickle-charge is provided to the battery pack.

HEELS may be activated manually or automatically. Automatic activation is tied to main rotor rotation through the permanent magnet generator (PMG) portion of the main aircraft generators. The PMG output is received by a signal conditioning unit for further processing. When main rotor rotation (Nr) is above 35 percent, the signal conditioning unit sends an inhibit signal to the control units. This prevents the light tubes from illuminating. Should Nr drop below 35 percent, the inhibit signal is removed and the system is activated. The light tubes illuminate immediately. Power to the light tubes is now provided by the nickel-cadmium battery packs.

Notice that the generators are not required to stop turning to activate HEELS, but only slow to a point where the rotors will not support flight. The inhibit signal is not sent to the control units on initial engine start-up until the rotors reach 35 percent Nr. At this point, the system is readied. Other methods of actuation, such as sensing main bevel gear rotation through a monopole pickup, may be used in aircraft that do not have PMGs, as is the case on the SH-60B. The signal conditioning unit contains two press-to-test switches. They test all control units and light tubes simultaneously by simulating the loss of PMG output signal. This test would normally be done on a preflight check. The conditioning unit also contains fuses that protect the aircraft electrical system.

The governing MilSpec MIL-L85676, requires that HEELS meet the following specifications:

- Minimum of 10 minutes operation.
- Independent operation at each hatch.
- An output of two lumens per lighted linear foot of light tube.
- Visible at 65 degrees off normal (or dead ahead) viewing.
- Compatible with night vision goggles.
- Operable from -1 degree Celsius to +71 degrees Celsius.
- Operable at 50-feet water depth and 50,000 feet altitude.
- Fully functional after a 24-G crash load in any axis.

HEELS is manufactured by H. Koch and Sons of Anaheim, Calif., under a contract from the Naval Air Systems Command. To date, approximately 100 HEELS shipsets have been installed in SH-3H aircraft at East Coast and West Coast squadrons. Two installations have been made so far on H-2 and CH-46 aircraft. A prototype has been installed on an SH-60B at NATC Patuxent River. HEELS is in the specification for the V-22 tilt-rotor aircraft, now undergoing full-scale development. Future HEELS use includes H-53 helicopters and fixed-wing aircraft such as the P-3, C-130, E-2 and C-2. HEELS has proven to be an effective, reliable system that will enhance survivability and ultimately save lives.

Mr. Wardle is with the Crash Safety and Survival Systems Branch, Air Vehicle and Crew Systems Technology Directorate, Naval Air Development Center, Warminster, Pa.

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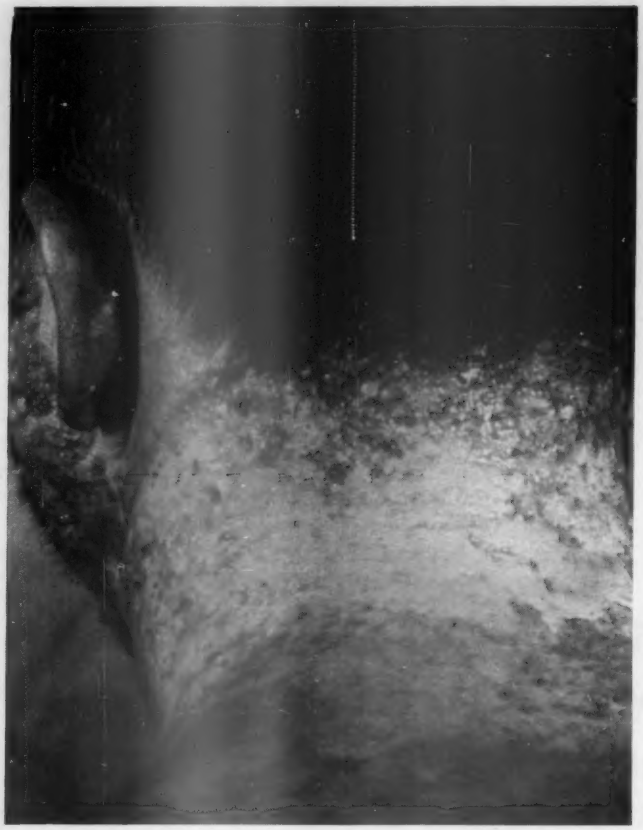
. . . There's a reason for everything, and most of these reasons have been written in nice, fresh, red blood . . .

My, That's a Lovely Shade of Red, White and Scar

By Cdr. V.M. Voge, MC

HAVE you ever thought how unbecoming your Nomex flight suit is? The Air Force calls them "zoom bags," and indeed they are. Unflattering bags, on most of us anyway. We all want to look sharp. Many of us make alterations on our suits, boots and whatever. After all, that gives us a sense of being ourselves — not just another "zoom bag."



1

Flight gear is designed with **protection** foremost in mind. All else is secondary. Let's start with the flight suit. It has sleeves that fasten at the wrist. However, many of us on warm days roll up the sleeves. Dumb! When there is a fire and your sleeves are rolled up and your gloves are off, you lose a big margin of safety.

What about your collar? Did you ever notice that it is made of Nomex also? It's supposed to be turned up to protect your neck. Photo 1 shows an aircrew member who felt it wasn't necessary to put the neck collar up. His head was OK (it was protected by the helmet), as was his back. But his neck is done "medium rare." This burn will leave a nasty scar that will also cause future problems.

Both of these problems are so very easy to prevent. Just wear your unflattering flight suit the way it was intended. Don't think that if there's a fire, you'll just put up your collar and roll down the sleeves. Fires are not planned. Most come on in a hurry, and you will be too busy doing other things to worry about taking care of things that needed to be done before.

What about those gloves, the Nomex ones that are always a problem? They're either in the way or too darn hot or don't fit right. Well, the gloves were also designed with your protection from fire in mind. As we've said before, the Nomex part of the glove protects you from the fire, and the leather parts of it are designed to give you some dexterity. They work together well, but you'll never know about it if you never wear them.

The Navy developed these gloves, and they're now being used by all services, simply because there is no better design. Notice in photo 2 that the man *was* wearing his sleeves down. His wrists are in good shape. However, his hands are burned.

This guy was lucky. The burn was not

2

so severe as to cause his hands to be amputated, but he is left with claws because of the scarring. You can't do much flying, or much of anything else, with hands like that. What to do? Wear your gloves.

Is the helmet a protection against fire injury? You bet it is! Photo 3 shows an air crewman with protected ears, hair and scalp, even though his face is burned. The more protection you give yourself, the better off you are. If a helmet is required or optional for your aircraft, wear it. Your chances of survival will be that much better.

Last but not least, your shoes or boots. Use them and wear them correctly. A lot of us think it's sharp to put zippers in our boots because it looks good or because it's too much of a pain to lace and unlace the boots all the time. Well, the zipper is a heat conductor; it conducts any external heat to your foot. The boot, made of heavy leather, resists heat and protects the foot.

If a piece of Navy protective gear doesn't have something when you get it, it most likely does not need any modifications. Why don't all of you sit down right now, in your flight suits, and see if the Nomex covers the top of the boot. If it doesn't, run, don't walk, to your nearest friendly parachute rigger and demand a flight suit that fits correctly. It's *your* feet. Double amputees aren't all that pretty. If you already have a "sharp" zipper installed in your boots, trade in your boots for a shiny new pair, minus the zipper.

3

Wear the protective gear issued you in the way it was intended. There's a reason for everything, and most of these reasons have been written in nice, fresh, red blood. The smart ones learn from other's mistakes; the dumb ones have to discover everything for themselves. If the stove is hot, don't touch it. Others have already learned that it is hot and that it will do bodily harm if touched. Why be a "relearner"? ◄

Cdr. Voge is a flight surgeon at the Naval Hospital, Corpus Christi, Texas. Previously, she was an instructor at the Air Force Flight Surgeons School and an aeromedical analyst at the Naval Safety Center.

Make Your SAR More Than Just a Fishing Expedition

By Lt. Mike Dunn

IT was a good-deal sortie — a reprieve from those grueling, night, air intercept control hops that always seemed to appear on the air plan of the nuclear-powered USS Neverdock.

Two A-7 pilots strolled into our ready room. It was a 2 v 2 DACT event, so we had the lead. As the senior F-14 pilot among the fighters, I covered the necessary administrative notes, including the line-up, tanking plan and communications. The weather was good, so we agreed on a TACAN radial that would place us clear of clouds, high above the gray Philippine Sea.

Since we had been tasked to develop the DACT syllabus, the mission specifics portion of the brief was fairly involved. We talked scenarios, simulated load-outs and kill removal. The A-7s would be Iranian F-4s. The discussion involved tactics and possible formations. We encouraged the Corsair drivers to be inventive since we wanted some good training, too.

Just before breaking up and getting down to our in-house game plans, I read from the standard ROE briefing guide. A representative from each section rattled off his aircraft's departure and spin procedures. Somewhere in the brief, I mentioned a few short words about SAR.

The first engagement went as briefed. A 2 v 2 to 180 degrees of turn — a warm-up for the second run, where we'd all agreed we'd do some more serious turning post-merge.

At merge plot on the second fight, the Tomcats and Corsairs met in the same piece of sky. After one circle in the air, the F-14s switched, and the engagement quickly developed into two separate 1 vs 1s. I heard shots being taken in the fur ball across the circle. I was preparing to take one of my own when it happened. My bogey's wingman called, "Break left." He pulled hard to defeat my shot. "Nice missile D," I remembered thinking at the time.

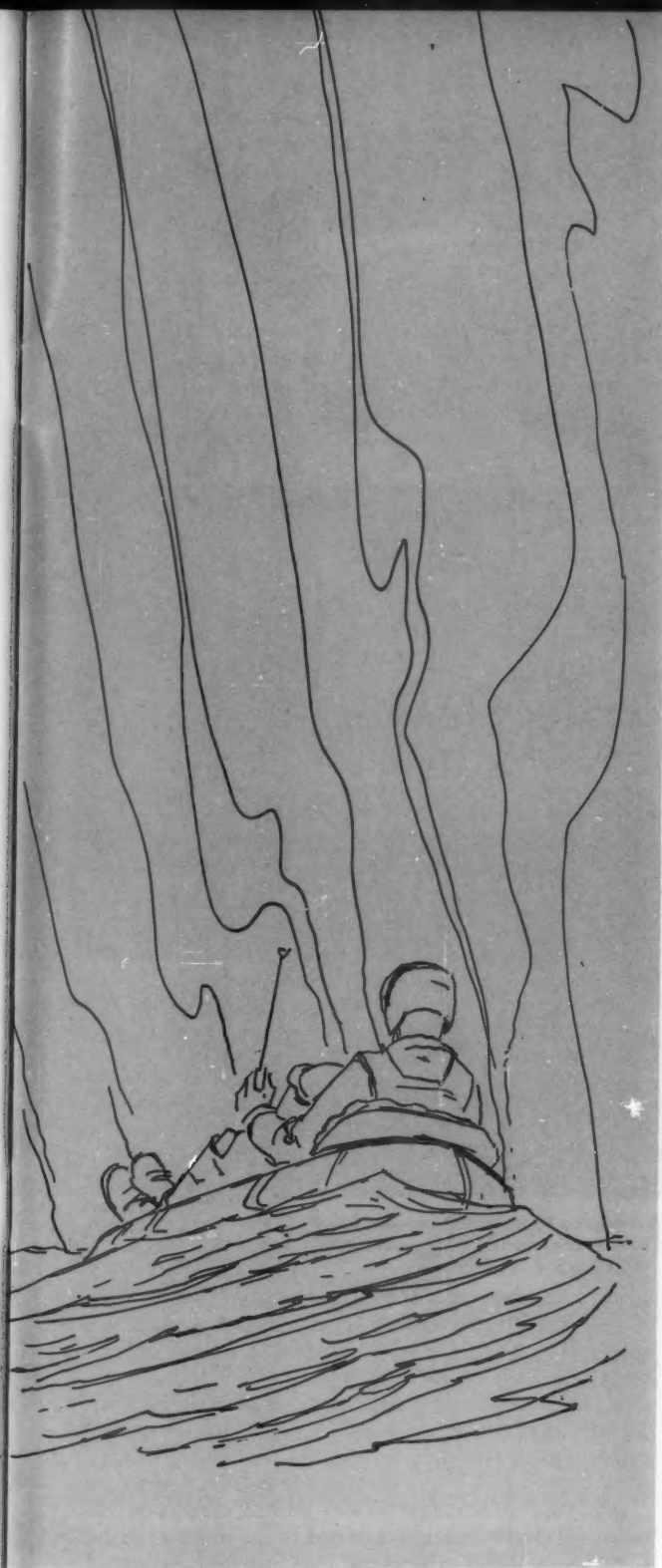
My only option was to pull up and outside the fight, hoping to preserve my energy advantage. Maybe I'd get another opportunity for a shot later. The A-7 appeared under my wing, 2,000 to 3,000 feet below. His nose was 25 to 30 degrees below the horizon, and the jet was corkscrewing straight down, spinning toward the water. There were the usual "knock it off" calls.

By this time, the Corsair was below 10,000 feet, and someone called that out on UHF. My memory of the ejection sequence, the pilot in his parachute and the attack jet splashing into the sea are still vivid.

By the time I thumbed to my SAR on-scene commander card, the radios were buzzing. The ship and everyone else airborne heard the emergency locator transmitter on guard.

Luckily, this story has a happy ending. The downed pilot was fished out of the water less than 90 minutes after he went in. Except for a few bruises, he was in remarkably good shape. On the other hand, there were some valuable lessons learned from this particular sortie, things that I could have done differently and will be done differently if ever I witness another fellow aviator go down.

- Mark the SAR scene. You can't find a man in his raft if you don't know where he is. TACAN cuts are fine, but only if you're within TACAN range of the ship or some other station.



In the case of the ship, the range and bearing are only accurate if the ship is dead in the water, and that usually never happens. In this case, the F-14 in low holding over the ejection site was unable to get a TACAN lock. His wingman, 10,000 feet above him, had to relay the information.

The Tomcat's inertial navigation system is an easy cross check for latitude and longitude. It will give you the winds, too. Squawk emergency on your IFF. That'll get somebody's attention. Use whatever you've got. Don't be so helpful in the SAR that you run yourself out of gas and become the second passenger in the helo that day.

• Get help. F-14s that have burned a lot of JP-5 in two 2 v 2 engagements don't usually have the legs to stay on station for an extended period of time. A quick call to the E-2 or the S-3 is mandatory. The Vikings offer the best long-range SAR on-scene capability. Since the plane guard helo is the most likely candidate to scoop the aviator out of the water, a timely call on your carrier's land-launch frequency gets him headed in the right direction. The SH-3 can't do more than about 110 knots on the deck, so it might take him a while to get there. In this particular SAR effort, the A-7 crashed 70 nautical miles from the CVN.

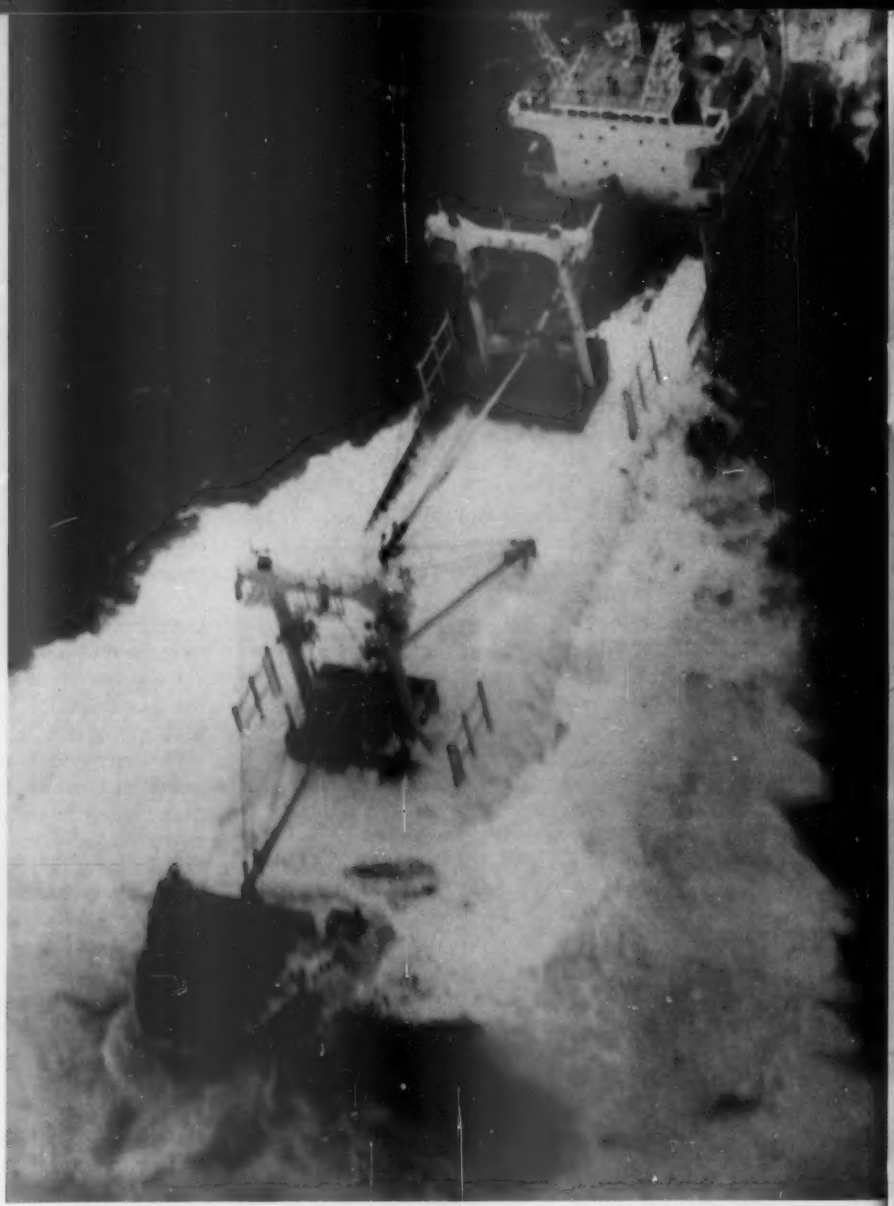
• Contact the survivor. I couldn't believe it — we were flying at less than 1,000 feet over the oil-and-gas slick, but we couldn't see him. The seas were 5-10 feet with occasional white water in the swells. He was down there, we knew it, but we couldn't see him. The first thing the Hawkeye asked us was the condition of the pilot. In high holding, the Tomcat and second A-7 could hear everything the man in his raft was saying over his PRC-90. The aircraft at 1,000 feet couldn't hear a thing! The survivor in the water is often the only person in the SAR who has the whole picture. He can see aircraft flying overhead and give his position relative to them. His efforts are useless unless he can be heard. Again, on this day, all calls had to be relayed to the low F-14. From day one of flight training, aircrew members are briefed and rebriefed that the PRC-90 can be unreliable in two-way communication if the radio antenna is pointed directly at the aircraft that they are attempting comms with. Imagine the additional confusion that could arise if only one SAR aircraft was on the scene or if the ejected aircrew was somehow unable to communicate with the SAR participants. ADF cuts kept us in the general vicinity of the downed pilot, but only his specific direction gave us the confidence we needed to vector the S-3 and the helo for a successful pickup.

• Use your SAR on-scene commander checklist. When I finally glanced at mine, I discovered a couple of things immediately. First, it was the same card I had carried since I was a student in the RAG, and it was outdated. Second, it had been designed for use in the NAS Miramar area, with specific procedures and UHF frequencies for Southern California SAR operations. If the possibility of losing an aircrew is a concern to your squadron, and I assume it is, you should develop SAR cards for each of the operating areas you will see in a typical Westpac or Med cruise. At the very least, the SAR effort must be completely understood by all players. ◄

Lt. Dunn flies F-14s with the VF-114 Aardvarks based at NAS Miramar, Calif. His squadron has been on deployment in the Indian Ocean.

A Basic Lesson in SAR

By Lt. Tim Williams



AO2 Todd Gerholdt/VP-49

The Balsa 24 with decks awash and listing 10 degrees to starboard. The VP-49 P-3C dropped a SAR kit (life rafts and survival gear) in an attempt to rescue 19 crewman aboard.

SHORTLY after assuming the Ready 2, Crew 7 was notified that they would be launched on a SAR mission within an hour. The briefing officer had limited information: A German cargo ship with 19 crew members was in distress, 700 nm northeast of our location in Bermuda.

A Coast Guard C-130 would act as on-scene commander, and a Canadian CP-140 Aurora would provide assistance. Our crew's thoughts shifted from an ASW prosecution to ensuring that all the necessary SAR equipment was loaded on their aircraft. During the transit they were informed that the C-130 had returned to base for a mechanical problem, so they would be coordinating the search with the Canadian crew.

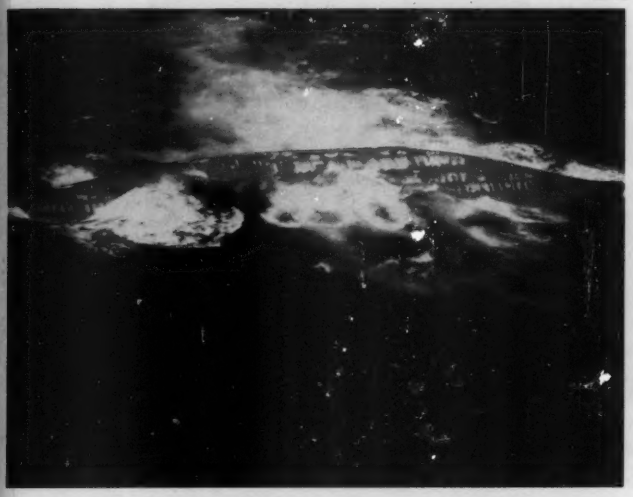
The crew encountered miserable on-station weather that greatly hampered search and rescue efforts; a 400 to 500 foot cloud layer, half-mile visibility, moderate turbulence, severe icing, rain showers and 65-knot winds. To make matters worse, the No. 1 inertial was lost during the IMC descent, giving the pilot's attitude indicator an erroneous indication. The PPC cross-checked the copilot's indicator and temporarily passed control of the aircraft to the copilot until he was able to select standby gyro and verify a valid attitude indication.

Once the attitude indicators were verified, the descent was continued, and a search was started to the south while the Canadians searched to the north. The Canadian crew located the ship a short time later, discovering that it was actually a Philippine ship, the Balsa 24, which was dead in the water,

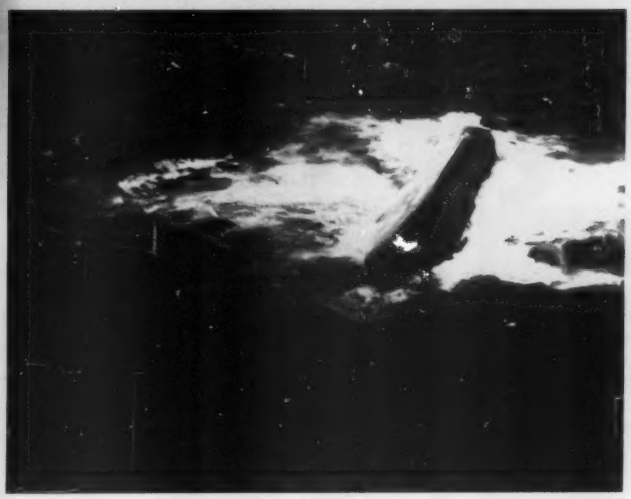
listing 10 degrees to starboard with decks awash in 40-foot seas. As Crew 7 continued searching to the south in an effort to locate surface ships that might render assistance, their forward radar failed. The in-flight technician swapped the heavy forward and aft radar RT units while the aircraft was being tossed about by turbulence. It was mutually decided that the two aircraft should exchange duties due to the P-3's degraded radar search capabilities.

After arriving at Balsa 24's location, Crew 7 established communications with the ship's captain. Despite his difficulties with the English language and his understandable anxiety, the captain indicated his desire to have the SAR kit deployed immediately since the ship was rapidly taking on water and only one lifeboat could be launched due to the severity of the seas and the condition of his vessel. Crew 7 immediately configured the aircraft for the SAR drop and set up for a practice approach. With conditions on the ship rapidly deteriorating, the captain signalled that his crew was preparing to abandon ship. Due to the ship's list and extreme winds, the SAR kit would have to be accurately placed on the leeward side in order for the ship's crew to have a chance to retrieve it.

VP-49



Views of the Philippine freighter rolling over shortly before it sank. Waves were 35-to-40 feet high and winds were up to 65 knots sustained.



VP-49

During a second practice run at 300 feet, the No. 1 engine's turbine section failed, spewing flame and chunks of metal out the exhaust pipe. Despite immediate application of maximum power and securing the No. 1 engine, the aircraft began a gradual descent toward the water due to the high gross weight and severe turbulence. The aircraft lost 100 feet of altitude before the airspeed built up enough to allow a positive rate of climb.

It was fortunate that the PPC had decided to increase the recommended airspeed for dropping the kit by an additional 10 knots to compensate for turbulence. Once the emergency was under control, Crew 7 precisely dropped the SAR kit. During Crew 7's climbout, the Aurora reported that both life rafts had inflated properly in perfect position for retrieval and the crew had tied them fast alongside the ship. Crew 7 returned to NAS Bermuda where they made an uneventful, three-engine landing. The post action report indicated that 19 crewmen had boarded the single lifeboat and two life rafts.

We learned several lessons from this experience.

Preparation. Take the time to prepare yourself and your crew before you are tasked with a SAR mission. Know the search and survival equipment that will be required and the procedures you will be using. SAR missions are usually time-critical, so the time spent on preparation will make you more efficient at getting on station and providing assistance.

Weather. Anticipate the worst weather conditions possible for the location and the season. Foul weather is often the cause of a SAR mission and you may very well find yourself flying in the same type weather.

Limitations. The life-or-death nature of many SAR missions may make an aviator decide to exceed his and the aircraft's limits in order to render the needed assistance. When doing so, don't forget that exceeding *aircraft* limits places you in an unknown region where you may not be protected by the design safety factor. The limits imposed by aerodynamics and physics are not flexible. So before you push yourself and your aircraft into a corner, make sure you've considered the consequences. In a life-or-death situation you will want to do everything possible to help the survivors, but you will be of no use to them if you fly yourself into the water.

Flexibility. SAR missions are often based on limited or sketchy information. As the mission progresses you may find that you have to adapt normal procedures to meet the actual situation and then modify these again as the situation changes. ◄

Lt. Williams is the aviation safety officer with VP-49.

Note: A related article appeared in our October 1987 Helicopter Safety special issue (p. 20). It is entitled The Psychological Implications of a Dark and Stormy Night or Breaking the Fatal Flight Formula by LCdr. Scott Olin, USCG, formerly flight safety officer of the USCG Air Station, Elizabeth City, N.C. — Ed.

Survival Training

How Important Is It?

By LCdr. J.W. Greene, III

. . . The initial rush of water came in the copilot's window. Suddenly I found myself upside down underwater, hanging in my seat . . .

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IT was a typical October day with the normal scattered layer of clouds and a 10-knot sea breeze blowing from the south. My flight was a checkride for an IUT (instructor under training) in the H-3 fleet replacement squadron. The brief, preflight and takeoff were normal with the same for our field work and overwater maneuvers. During our final practice SAR, however, we ran into some problems.

We were practicing verbal control with the FRAC (fleet replacement aircrewman) one more time since it was only his second flight in the SH-3 helicopter.

The IUT in the left seat was at the controls in a 40-foot hover when the helicopter started slowly yawing to the right. He applied full left pedal to no avail, and I came on the flight controls.

The yaw rate was accelerating as I applied full left rudder, secured the ASE (automatic stabilization equipment) and the auxiliary hydraulic system. This had no effect, and I was trying to maintain a stable position over the water. The helicopter would soon be out of control because the yaw rate continued to accelerate. I lowered the collective to make what I hoped would be a controlled water landing. Just before water impact, I raised the collective to cushion the landing.

We touched down in a hover attitude, but the helicopter was moving forward and left. On impact, we rolled over to the left. I had the cyclic fully to the right, but that didn't stop the helicopter. I felt all five main rotor blades hit the water one at a time. My copilot attempted to get the speed selectors secured, but he couldn't reach them.

The initial rush of water came in the copilot's window. Suddenly I found myself upside down underwater, hanging in my seat. Then I had to egress from this position. I never took my eyes off the window I was going out of. I could not move. Then I realized that I had not released my lap belt and shoulder harness. I reached down and released them, and immediately my body went upright.

I egressed through the open window (without jettisoning it) and popped to the surface next to the inverted helicopter. I grabbed onto the helicopter but remembered that it could sink at any second. I paddled away from the helicopter and tried to inflate my LPA. However, only the right lobe inflated when I pulled the toggles, so I pulled the right toggle again. This time the left lobe inflated. I snapped the lobes together and started looking around for the rest of the crew.

The two aircrewmen came swimming up to me, and we looked around for our copilot. He was about 30 yards away; we could not tell how he was doing. We called but he didn't answer. I pulled out my PRC-90 survival radio and plugged it into my helmet. I couldn't hear anything, so I took off my helmet and used the earplug. That worked and I talked to ground control on guard. In about five minutes an SH-2 helicopter flew overhead, but before it could make an approach, an SH-3 helicopter was shooting an approach to us.

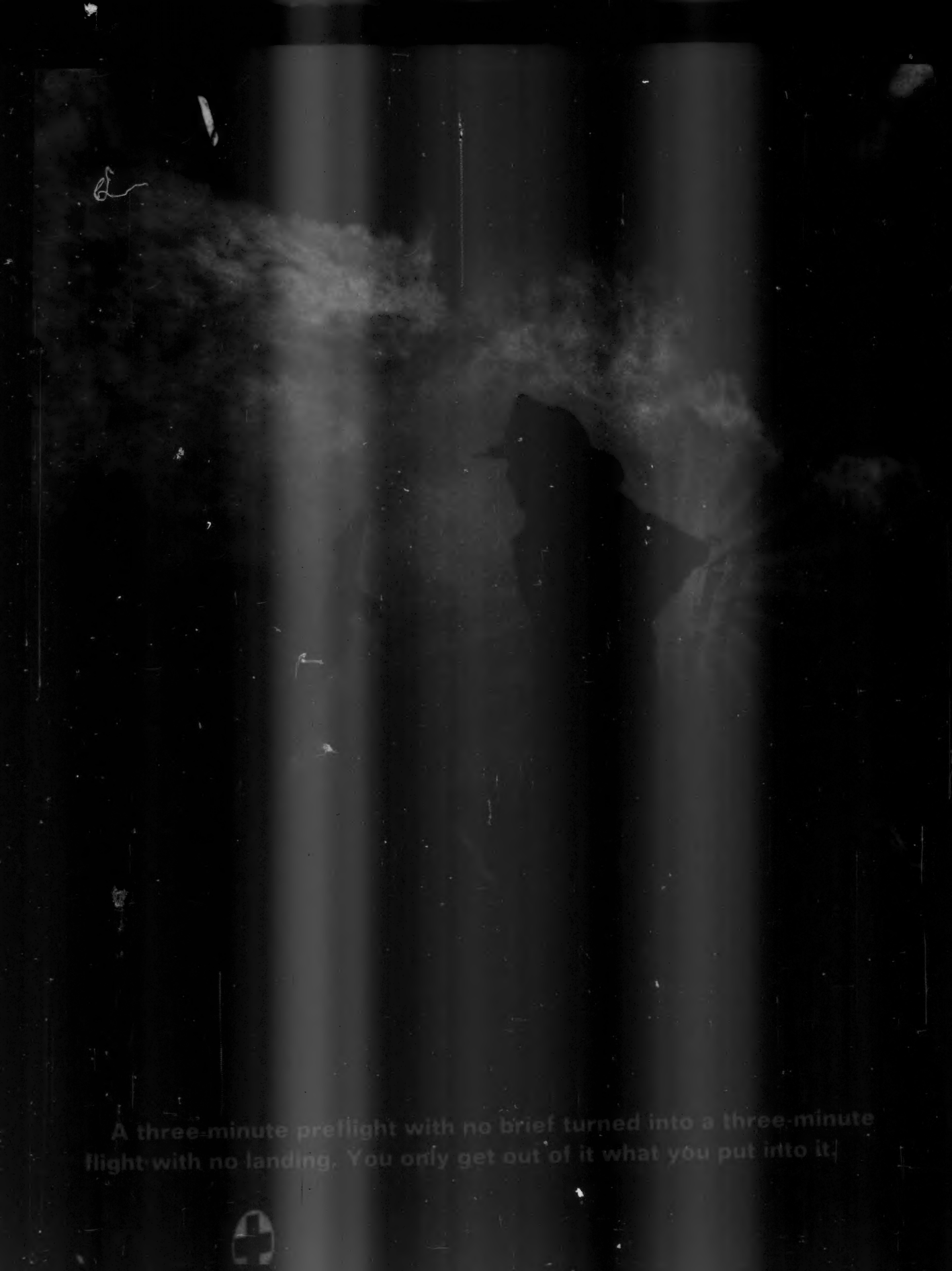
The SH-3 picked up my copilot first. I was picked up next followed by my two crewmen. We were flown back to our base where an ambulance was waiting on the helo ramp for us. From there we were transported to the dispensary.

Without survival training, I might not be here to tell this story. DWEST, water survival, ditch and egress training enabled me to handle this situation. Take heed of the survival training you are required to take. It may save your life some day. ◄

LCdr. Greene is assigned to HS-2, an SH-3 squadron based at NAS North Island, Calif.

Cdr. Harry F. Thomas, commanding officer of VT-6, points with pride at VT-6's unprecedented fifth consecutive Naval Aviation Safety 'S' award. Bravo Zulu VT-6!

They Didn't Get There By Accident


A three-minute preflight with no brief turned into a three-minute flight with no landing. You only get out of it what you put into it.